NOVEMBER 2, 2015

TIME

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FUSION

IT MIGHT ACTUALLY WORK THIS TIME

By **Lev Grossman**

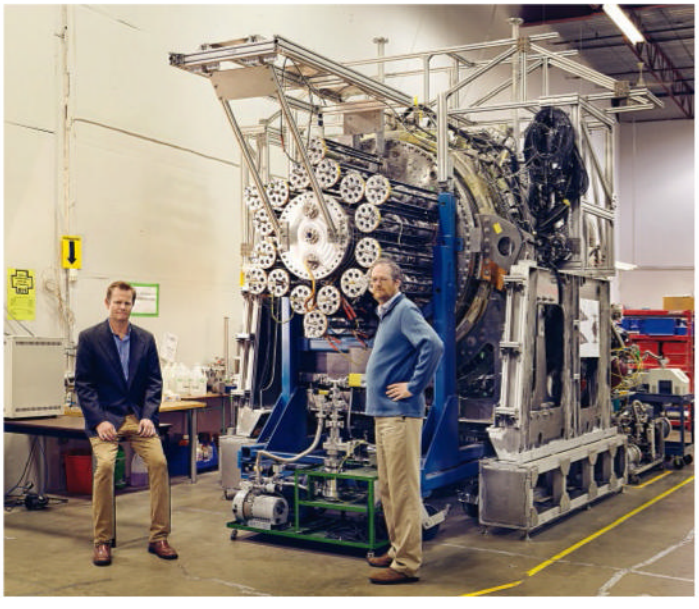
TIME
VOL. 186, NO. 18 | 2015

Cover Story

Star Power

The race to build the world's first commercial fusion reactor is heating up

By Lev Grossman 30



Nathan Gilliland, left, and Michel Laberge of General Fusion

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Or at least she has an uneasy relationship with it. But the GOP candidate and former CEO's supporters don't seem to mind

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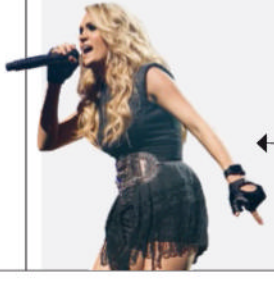

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FUSION: VINCENT FOURNIER FOR TIME; UNDERWOOD: BRIAN RASIC—WIREIMAGE/GETTY IMAGES

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What you said about ...

MILLENNIAL MOMS AND DADS Katy Steinmetz's Oct. 26 cover story, on the newest generation of parents, prompted Kristin Iversen of *Brooklyn* magazine to write that reading it was a "crazy, looking-into-a-mirror" moment. Some millennials, like Evan Fowler of Cincinnati, were offended by what they saw as "bogus stereotypes" about young parents—like turning to the Internet rather than to experts for child-care information—while others defended their cohort's characteristics as a win for children. Being highly educated and treating working women with respect are "solid parental traits," said Catherine Holly of Elmhurst, Ill. Meanwhile, Merrel Wilkenfeld of Fort Mill, S.C., cautioned that the younger generation still has something to learn—for example, about using smartphones at meals. "Long term, [their] kids will not have honed any conversational skills," he wrote.

'It's a shame, but not surprising, that millennial kids need to go to camp to "unplug."'

JOHN STARK, St. Louis

'Based on the debate, I would vote for Sanders! No more Clintons or Bushes, no matter what the media writes!'

ROSEMARIE SEATON, Trenton, Mich.

THE DEMOCRATIC DEBATE Many Bernie Sanders supporters took issue with Joe Klein's column declaring Hillary Clinton the winner of the first Democratic primary debate. Klein's description of Sanders' ideology as a "political fetish" was "a cheap shot by a political insider," wrote Dale McCarty of Boerne, Texas. But Roger DeVore of Dunlap, Ill., thought Sanders had missed a chance to criticize Clinton. "It is not hearing about the 'damn emails' that has people sick and tired," he wrote. "It is hearing Ms. Clinton's ever changing stories about them."

FROM THE ARCHIVES Arthur Miller, who would have turned 100 in October, wrote dozens of plays and won the Pulitzer Prize. Along with his professional accomplishments, he also remains famous for his short marriage to Marilyn Monroe. LIFE's Paul Schutzer photographed the pair shortly after their courthouse ceremony in June 1956, capturing the start of a union that ended five years later. See more at life.time.com.

MILLER AND MONROE: PAUL SCHUTZER—THE LIFE IMAGES COLLECTION/GETTY IMAGES

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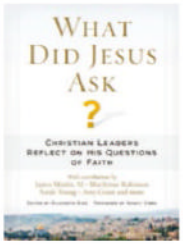

UP NEXT In a new anthology from TIME Books, more than 70 of today's most prominent spiritual thinkers offer insights, interpretations and meditations on the questions Jesus asks in the Bible. Edited by Elizabeth Dias, a religion and politics correspondent for TIME, with a foreword by TIME editor Nancy Gibbs, *What Did Jesus Ask?* features a range of Christian voices and includes contributors such as Ecumenical Patriarch Bartholomew, musician Amy Grant, pastor Rob Bell and writer Marilynne Robinson. *What Did Jesus Ask?* is available Oct. 27.

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SCAN TO DISCOVER MORE

SINGAPORE AIRLINES
A great way to fly

A STAR ALLIANCE MEMBER

'We must, for the future of our children, turn back from this dangerous abyss.'

BAN KI-MOON, United Nations Secretary-General, urging peace during a visit to Israel, where a spate of stabbing attacks has raised the prospect of a third *intifadeh* between the Israelis and the Palestinians

Hasbro
Toys for the new *Star Wars* movie helped lift profits by 15%

GOOD WEEK
BAD WEEK

Mattel
Declines in Barbie-doll sales sent earnings down 33%

'WHILE I WILL NOT BE A CANDIDATE, I WILL NOT BE SILENT.'

VICE PRESIDENT JOE BIDEN, pledging to "speak out clearly and forcefully" on issues important to him during the remainder of his time in office after he announced he will not run for President

60

Number of career touchdowns by New England Patriots tight end Rob Gronkowski, a mark the sixth-year pro reached faster than any other tight end in NFL history

52

Years an unidentified person **kept two books from Portland State University's library** before returning them in October; the library does not charge late fees

'I CANNOT AND WILL NOT GIVE UP MY FAMILY TIME.'

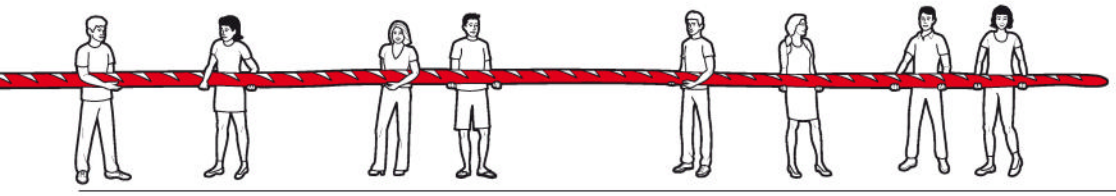
PAUL RYAN, Republican congressman, offering to serve as Speaker of the House if divided GOP lawmakers unite behind him, but only under certain conditions, including that he won't travel as much as previous Speakers

'I've never seen Netflix in my life. I have no idea how to get it.'

BILL MURRAY, actor, joking that it's "unfortunate" that he'll never see his own *A Very Murray Christmas* special on the streaming service in December

'I believe in the program so much I decided to invest in the company.'

OPRAH WINFREY, media mogul, on buying a 10% stake in Weight Watchers International; shares of the diet-program company more than doubled after the Oct. 19 announcement, netting Winfrey about $70 million in one day



401

Length, in feet, of a baguette in Milan that set a Guinness World Record for the longest one ever

BARBIE: ALAMY; GETTY IMAGES (4); ILLUSTRATIONS BY BROWN BIRD DESIGN FOR TIME

The Brief

'THE EVIDENCE SIMPLY NO LONGER SUPPORTS ONE-SIZE-FITS-ALL.' —PAGE 12

Biden, shown at an Oct. 20 event, said in his announcement, "We can do so much more."

CAMPAIGN

Saying 'the window ... has closed,' Biden takes a pass on a run

By Philip Elliott

IN THE END, IT WAS A CLASSIC WASHington squeeze play. For weeks, Vice President Joe Biden had delayed a decision on whether to mount a third run for President. Now, powerful interests were trying to speed his timetable. Senior Democrats, taking their cues from the Hillary Clinton campaign and the White House, leaked word that he was eyeing a decision soon, essentially pushing him to choose one way or the other. Even President Obama was left to ask aides what they were hearing. "The Vice President is a fool," one told the President, rightly predicting that he would pass, "but he is not stupid."

So on Oct. 21, with his wife and the President by his side and his oldest friends watching from the wings, Biden announced that he would forgo one more try at the job he had always wanted. "Unfortunately, I believe we're out of time," the Vice President said, "the time necessary to mount a winning campaign for the nomination."

Biden has never been one to flinch from a fight, but this time was different. In early summer, the Vice President had buried his older son, Beau, 46, the heir to the Biden political legacy who lost a long, brave fight with brain cancer. Biden spoke openly about his grief as word leaked that Beau's dying wish for the man he called Pop was one more presidential campaign. To be a candidate for the White House, he told Stephen Colbert on *The Late Show,* he would have to commit "my whole heart, my whole soul, my energy and my passion to do this." Then, "I'd be lying if I said I knew I was there."

AP

PHOTOGRAPH BY MOLLY RILEY

In his Rose Garden remarks, Biden explained that the mourning process had continued to unfold. "I know from previous experience that there's no timetable for this process," he said. "The process doesn't respect or much care about things like filing deadlines or debates and primaries and caucuses." While his family was healing, he said, the time had run out, if not to enter the race, then to have much chance of winning it.

If he had jumped in, Biden would have become the first sitting Veep in recent memory to enter the presidential race as an underdog to succeed his boss. He would also have started some 27 points behind Clinton, according to a CNN/ORC poll released Oct. 19, with a plurality of voters in his own party—38% to 30% in a separate NBC/*Wall Street Journal* poll released a day later—saying he should just retire. He had no campaign money, almost no campaign apparatus and an alumni network that was in many respects skeptical of a race. Nonetheless, he sounded like a candidate-in-waiting as he phoned allies and interviewed potential campaign staff.

The smart money was stacked against him, so Biden chose the next best route. "While I will not be a candidate, I will not be silent," he said, before launching into what would have been his campaign stump speech: a call to help the middle class, extend public education into adulthood, reform campaign finance, address inequality, dampen partisan division and fund a moon-shot bid to cure cancer. "And when we do," he said, "America won't just win the future, we will own the finish line."

Is Biden's own run finally near its end? All his years in Washington have imbued him with talents that many others lack, including a knack for landing a political blow without looking like a jerk. "We've had two great Secretaries of State," he said early last week, before he withdrew. "But when I go, they know that I am speaking for the President." He added a comeback to Clinton's recent boast at the Democratic debate that she was proud to call some Republicans her enemies. "The other team," he said, "is not the enemy." Both remarks were warning shots to Clinton, and he repeated the latter even as he said he would not run.

Biden did not rule out a future role in public service. After all, it's how he and his clan have coped with grief in the past, and he says he is on the mend.

As Beau lay ill, friends and family wore wristbands that read WWBD?—What Would Beau Do? The father concluded that his son would have wanted him to run for President, yes. But Beau also would not have wanted to see his Pop fail. Joe Biden has accomplished, and suffered, enough. □

TRENDING

MIGRATION
Countries along the western Balkan route into Europe will meet for an E.U. summit Oct. 25 after Slovenia **sent its army to the border with Croatia** on Oct. 20 to deal with a surge of 20,000 migrants attempting to reach northern Europe before winter sets in.

HISTORY
Israeli Prime Minister Benjamin Netanyahu sparked controversy by saying that a Palestinian, the Grand Mufti of Jerusalem, **persuaded Adolf Hitler to exterminate the Jewish people during World War II.** Israel's chief historian on the Holocaust disputed the claim.

DRONES
Americans may soon have to register their drones with the U.S. government, which **launched a task force Oct. 19 to create a federal registry for unmanned aircraft.** Drone sales are set to soar over the holidays, raising concerns about possible collisions with airplanes.

BIG QUESTION

What happens when drugs aren't illegal?

A leaked U.N. report recommending that countries decriminalize narcotics for personal use brought the war on drugs into the global spotlight, even though it was later shelved. Countries that have loosened drug restrictions can boast some successes. —*Naina Bajekal*

PORTUGAL
Decriminalized the possession of all drugs for personal use in 2001. Since then, overall drug use has fallen, HIV cases among drug users dropped, and overdose deaths are the second lowest in the E.U.

SWITZERLAND
Has provided heroin addicts with free methadone since 1994 and hands out clean needles, halving the number of drug injectors with HIV and cutting crime. Bern also decriminalized marijuana in 2013.

URUGUAY
Formally legalized marijuana in 2013 with plans to sell it for $1 per gram. Though the state has struggled to sell retail pot, buying marijuana on the black market is reportedly cheaper, causing drug cartels to suffer.

THE NETHERLANDS
Although the Dutch policy of tolerance toward soft drugs permits "coffee shops" to sell pot without fear of prosecution, marijuana use per capita is much lower in the Netherlands than in the U.S.

DIGIT

6.9%

Economic growth reported by China in the most recent quarter, the worst rate since the global financial crisis

WARM WELCOME Russian President Vladimir Putin greets Syrian President Bashar Assad at the Kremlin in Moscow on Oct. 20 for an unannounced meeting to discuss their joint military campaign in Syria. Assad, making what is believed to be his first foreign visit since Syria's civil war began in 2011, said Russia's intervention in Syria had slowed the spread of terrorism, and he hinted at a political transition after the military action. *Photograph by Alexey Druzhinin—AFP/Getty Images*

EXPLAINER

Inside Nepal's bloody fuel crisis

ACROSS NEPAL, FOOD PRICES HAVE climbed as a growing political dispute over a new constitution hits the flow of fuel and essential goods into the landlocked Himalayan nation, still recovering from a devastating earthquake in April. Here's what's behind the standoff:

GEOGRAPHY Nepal is surrounded on three sides by India, the country's main trading partner. The northern border with China cuts through the Himalayas, making it unsuitable as a trading route. The current crisis stems from unrest where the country borders India.

PROTESTS Ethnic minority groups concentrated near the Indian border say a new constitution passed on Sept. 16 ceded too much power to northern and Himalayan ruling classes. Violent clashes have reportedly left 40 dead.

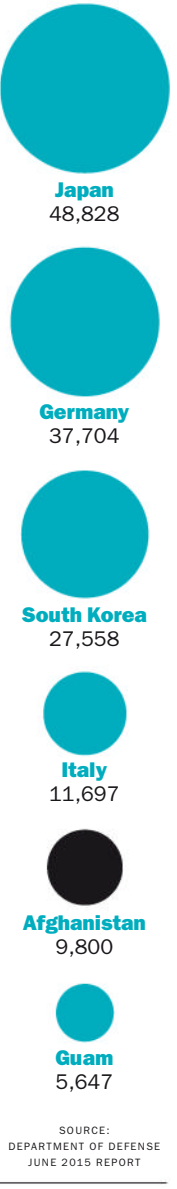
Passengers on an overcrowded bus in Nepal in October amid fuel shortages

BLOCKADES Kathmandu says India has shut border crossings in sympathy with protesters, but India maintains that the protests have obstructed trade routes on the Nepalese side. Although Nepal's newly appointed Prime Minister, K.P. Sharma Oli, has pledged to "address the hardships," a long and dangerous winter looms with fuel in diminishing supply. —NIKHIL KUMAR

DATA

BOOTS ON THE GROUND

The White House will keep 9,800 U.S. troops in Afghanistan through 2016 instead of withdrawing. Here's how that compares with other places overseas where U.S. troops serve:



SOURCE: DEPARTMENT OF DEFENSE JUNE 2015 REPORT

MIGRATION, FUEL: REUTERS; HISTORY, DRONES, DRUGS: GETTY IMAGES

TRENDING

RELIGION
Pakistan's chief Islamic body ruled Oct. 20 that Muslim **women are not required to cover their faces, hands or feet.** However, the council's chairman noted that it's still better to do so to avoid the "danger of spreading disorder."

JUSTICE
Nebraska will vote on **whether to abolish the death penalty in November 2016** after a petition drive by supporters to suspend its recent repeal. Ohio and Oklahoma have also suspended executions over issues with lethal-injection drugs.

HEALTH
Texas **cut all Medicaid funding to the state's Planned Parenthood clinics** on Oct. 19, a day after a federal judge blocked Louisiana's attempt to defund clinics by ruling that funding must continue as the group's legal challenge proceeds.

WOMEN'S HEALTH

Mammogram guidance gets an overhaul—again

By Alexandra Sifferlin

FOR THE FIRST TIME IN 32 YEARS, THE American Cancer Society (ACS) has changed the age at which it recommends women start getting regular mammograms. The ACS now advises that women at an average risk for breast cancer begin yearly screening at age 45—it had previously recommended starting at 40—and to transition at age 55 to a schedule of every other year.

The new recommendations, which represent a more personalized approach to the question of who needs screening when, are the result of an ACS evidence review that was published Oct. 20 in the journal *JAMA*. While the new guidelines advise every-other-year for women over 55, the ACS also emphasizes that women should have the option of sticking with an annual schedule if they choose. Women should also have the option to begin regular screening at 40, the report says.

The ACS says its guidelines were due for an update; the group's most recent recommendations are 12 years old. "In 2003 nobody talked about the balance of benefits and harms, which is now really a standard for guidelines," says Dr. Richard Wender, chief of cancer control at the ACS.

One of the drawbacks of screening is false positives: over 10 years, a woman receiving an annual mammogram has a 61% chance of getting such erroneous results. Another is mounting evidence that aggressive treatment of some early-stage cancers is unnecessary and can have lifelong side effects.

> 'The evidence … no longer supports one-size-fits-all.'
>
> **DR. KEVIN OEFFINGER,** chair of the ACS breast-cancer-guideline panel

The new guidance may clear up some confusion around when—and how often—women should get mammograms. In 2009, the U.S. Preventive Services Task Force said there was insufficient evidence to support the recommendation that women start at 40, and it changed its official advice to biennial screening beginning at 50 for most women. Until now, the ACS continued to recommend a starting age of 40.

"The evidence simply no longer supports one-size-fits-all," says Dr. Kevin Oeffinger, chair of the ACS breast-cancer-guideline committee. "In medicine we are moving closer and closer to bringing about a personalized approach." ◻

2016 ELECTION

Presidential pranksters

The Federal Election Commission (FEC) has received over 1,200 presidential-candidate registrations this year, three times as many as in 2012. Most of the applicants aren't serious—many aren't even human. But some are still winning, in their own silly ways. —*Tessa Berenson*

DEEZ NUTS
Iowa high school student Brady Olson persuaded Public Policy Polling to test his fake identity against Hillary Clinton and Donald Trump in North Carolina, even though he is 20 years too young to be President. He got 9% of the vote.

HONEST GIL FULBRIGHT
Actor Frank Ridley's phony alter ego promises to deceive voters and sell his office to donors. Although he hasn't filed with the FEC, he beat Jeb Bush in a New Hampshire straw poll and raised $50,000 last quarter, three times as much as Lincoln Chafee.

VERMIN SUPREME
The performance artist has run for President several times since the 1990s. His platform: free ponies for all Americans, mandatory-toothbrushing laws and time-travel research so he can go back to kill Hitler as a baby.

EXPLAINER

Why the government is investigating fantasy sports

DAILY FANTASY SPORTS, WHERE users fork over an entry fee and compete for a cash prize based on the performance of players in real pro games, has grown into a $3.7 billion industry almost overnight. Now the FBI and multiple state attorneys general are probing DraftKings and FanDuel, the leading companies in this lightly regulated world. Here's what's driving the controversy.

INSIDER-TRADING ALLEGATIONS
A DraftKings employee with access to sensitive data later won $350,000 playing on FanDuel. Both DraftKings and FanDuel now bar employees from playing on any sites; DraftKings says an investigation cleared the employee of any wrongdoing. Still, consumers have filed at least eight class-action lawsuits against the companies.

SHADES OF GAMBLING
Sports gambling is illegal nearly everywhere except Nevada. But a 2006 federal act barring unlawful online gambling exempts fantasy sports, designating it a game of skill. On Oct. 15, however, Nevada officials ruled that daily fantasy was indeed a form of wagering and prevented sites from operating there without gaming licenses. Members of Congress have also called for hearings on the legality of daily fantasy.

POWERFUL INVESTORS
The NBA, NHL and MLB own equity in either DraftKings or FanDuel, and Robert Kraft, owner of the NFL's New England Patriots, is a DraftKings investor. So pro sports leagues stand to profit from daily fantasy's growth, while all but the NBA publicly oppose sports gambling. —SEAN GREGORY

Milestones

RELEASED
From prison, **Oscar Pistorius,** after serving one year of his five-year sentence for culpable homicide in the death of his girlfriend Reeva Steenkamp. The South African Paralympian is set to spend the rest of his sentence under house arrest at his uncle's home in Pretoria.

DISCOVERED
Strong evidence that Central Asia is **the most likely location of dogs' first domestication,** possibly in modern-day Mongolia or Nepal, after researchers analyzed DNA from nearly 5,400 dogs.

DECLARED
By Hawaii Governor David Ige, a **state of emergency** over Hawaii's enormous homeless population, which is greater per capita than that of any other state in the U.S. The declaration allows Ige to direct $1.3 million toward building housing facilities and maintaining other shelter programs.

DIED >
George Mueller, 97, engineer who played a critical role in NASA's program to put a man on the moon. The day the Apollo 11 crew returned to Earth, he declared, "Today . . . we conclusively proved that man is no longer bound to the limits of the planet on which for so long he has lived."
> Skip Yowell, 69, co-founder of the backpack retailer JanSport, which got its start making packs for hikers and now caters more to students. The company was sold in 1986, but Yowell retained the title of vice president.

Mueller, center, celebrating the successful takeoff of Apollo 11 on July 16, 1969

ROUNDUP

Healthiest Halloween candy

Cooking Light recently analyzed 40 popular trick-or-treats to determine which were the least nutritionally terrifying. A sampling:

ROLO CARAMELS IN MILK CHOCOLATE
3.7 grams sugar per serving

HERSHEY'S NUGGETS DARK CHOCOLATE WITH ALMOND
4 grams sugar

HERSHEY'S ASSORTED MINIATURES
4.4 grams sugar

STARBURST (FUN SIZE)
6 grams sugar

SMARTIES
6 grams sugar
—*Alexandra Sifferlin*

RELIGION: REUTERS; JUSTICE: GETTY IMAGES; HEALTH: DEEZ NUTS: ERIN GUGE—CAMDEN PHOTOGRAPHY; FULBRIGHT: NICK RICHTER FOR REPRESENT.US; SUPREME: AP; MUELLER: NASA; CANDY: JEN TSE FOR TIME; ILLUSTRATION BY MARTIN GEE FOR TIME

CANADA

A new Prime Minister could fix the troubled U.S.-Canada relationship

By Ian Bremmer

The sweeping win by Trudeau, left, will bring back Canada's liberal traditions

THE RELATIONSHIP BETWEEN THE U.S. and Canada should be as placid as Lake Ontario on a calm summer day. The border is undefended. Their peoples seem like cousins. Each is the other's largest single trading partner. Yet there has been serious friction between the two neighbors in recent years—friction that might now be eased by the surprise election of a new Canadian Prime Minister.

Since winning power in 2006, Conservative Prime Minister Stephen Harper, more aligned politically with U.S. Republicans than with Democrats, amassed one grievance after another with his American counterparts. Harper wanted the Obama Administration's support for the Keystone XL pipeline, which would boost Canada's oil-rich economy by moving 800,000 barrels of oil-sands crude per day from Alberta into the U.S. He wanted a larger Canadian role in U.S. negotiations with Japan over the Trans-Pacific Partnership (TPP), an enormous Pacific Rim trade deal. He wanted a more interventionist foreign policy approach in the Middle East and in Ukraine, which Obama resisted. At times U.S. Ambassador to Canada Bruce Heyman found himself frozen out of meetings with senior officials in Harper's Cabinet.

That point is now moot. On Oct. 19, Justin Trudeau's Liberal Party ousted Harper's government in a sweeping election victory. Trudeau—the son of Pierre Trudeau, one of Canada's most successful Prime Ministers—will now enjoy a solid parliamentary majority, while Harper was left to resign as the leader of the repudiated Conservatives.

Obviously Canadians didn't vote in Trudeau just to please their American neighbors. Nearly a decade of Conservative rule by the often belligerent Harper left voters hungry for a candidate who could promise change. Though just 43 years old and relatively untested, Trudeau conducted an effective campaign, arguing that a slowing Canadian economy needed stimulus, not more of the Conservatives' austerity.

Harper's pledge to make Canada an energy superpower now looks foolish with low oil prices weighing on production of the country's high-priced oil-sands projects, while his party's condemnation of the "barbaric cultural practices" of Muslim immigrants alienated voters who value Canada's reputation for cultural tolerance. The upbeat Trudeau, by contrast, promised "sunny ways," as he said in his victory speech.

But if Trudeau's win was primarily about internal Canadian politics, he will make a difference in relations with Washington. Trudeau favors the Keystone pipeline but is much less eager than Harper to push a reluctant Obama to approve the project. The Obama and Trudeau teams will find common cause on climate change in the lead-up to a major U.N. summit in Paris at the end of the year. Despite reservations on the campaign trail about TPP, Trudeau is unlikely to push his party to reject the deal. Obama and Trudeau don't see eye to eye on everything—Canada's new Prime Minister has already pledged to end his nation's involvement in the bombing of ISIS targets in Iraq and Syria, while offering more humanitarian aid in those countries. But the U.S.-Canadian conversation is about to get a lot friendlier.

During his nearly 10 years as Prime Minister, there were times when Harper seemed intent on making Canada more like the U.S. Though Harper was born and raised in Ontario, his political base was Canada's western provinces, particularly Alberta, which exerts a distinctly conservative pull on the nation's politics. Some of Harper's recent comments on the need for immigrants to adapt to mainstream Canadian society suggested he believed in the American "melting pot" philosophy of assimilation, rather than the "mosaic" approach, with its respect for cultural diversity, a distinction that Trudeau's father established in the 1970s as crucial to a changing Canada's identity.

The truth is, for all their similarities, the U.S. and Canada are politically different—and their relationship will be all the better for acknowledging it. □

A new northern neighbor

CLIMATE CHANGE
Trudeau has promised to attend the U.N. climate talks in Paris at the end of the year

KEYSTONE XL
He will de-emphasize the controversial oil-sands pipeline

SYRIA
He has pledged to pull Canada out of the bombing campaign against ISIS

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DHAKA

A wave of killings reveals the rise of Islamist terrorism in Bangladesh

By Nikhil Kumar

Bangladeshi activists take part in a protest in Dhaka on Feb. 27 over the murder of secular blogger Avijit Roy

NILADRY CHATTOPADHYA WAS IN HIS apartment in the Bangladeshi capital of Dhaka, around noon on Aug. 7, when there was a knock on his door. "Without opening the door, I asked, 'Who is it?'" remembers his wife, Asha Moni. It was a young man who said their landlord had sent him to view their apartment, as he was thinking of renting a similar unit that was locked. Moni let him in. Minutes later, three men barged through and brutally hacked Chattopadhya to death with a machete.

Born a decade and a half after Bangladesh won its independence from Pakistan in 1971, Chattopadhya believed in the founding ideals of his country: Muslim but secular, united by the Bengali language and its tolerant culture. In 2013, the 27-year-old blogger joined street protests known as the Shahbag movement that demanded capital sentences for pro-Pakistan Islamist leaders found guilty of war crimes during the independence fight. (Two have been executed since 2013.) Backing them today were radicals bent on turning Bangladesh into a hard-line religious state—the same radicals who eventually murdered Chattopadhya.

Chattopadhya's was the fifth such killing since the 2013 protests, making him the latest victim of a violent clash between radicals and Bangladesh's embattled liberals. "In a sense, we won independence in 1971, but we are still fighting the long war for Bangladesh," says K. Anis Ahmed, publisher of the Dhaka *Tribune* newspaper.

THE FIRST KILLING, of the blogger Ahmed Rajib Haider, occurred in February 2013. Like Chattopadhya, Haider had written against religious fundamentalism. Then, in February this year, machete-wielding assailants murdered Avijit Roy, a Bangladeshi-American writer and blogger critical of religion. In March came the killing of Washiqur Rahman, followed by the murder of Ananta Bijoy Das in May.

All five were targeted in an Islamist campaign to paint those involved in the Shahbag protests as atheist and anti-Islamic—charges guaranteed to anger ordinary Bangladeshis. But while Roy, Chattopadhya and others were atheists, "in the Shahbag [movement], we never asked anyone's religion," says Arif Jebtik. Jebtik is a practicing Muslim, yet his name has appeared on blogger hit lists circulated by Islamist radicals—lists that have also featured Roy, Chattopadhya, Rahman and Das.

The response of Prime Minister Sheikh Hasina has done little to cool the climate of fear. Authorities have rounded up 20 suspects in the killings this year and Bangladesh has banned Ansarullah Bangla Team, the local radical group blamed for the murders. But Hasina, while stressing her commitment to secularism, has little sympathy for those who identify with no religion. "If anybody thinks they have no religion, O.K., it's their personal view … But they have no right to write or speak against any religion," she tells TIME.

The stakes could not be higher. As ISIS grows beyond the Middle East and al-Qaeda seeks to regroup in South Asia, Bangladesh—a country of 160 million that is over 90% Muslim—could be fertile ground for the growth of fundamentalism. Hours after Chattopadhya's death, a group called Ansar al-Islam that identified itself as a branch of al-Qaeda took credit for the attack. More recently, social-media accounts with suspected ties to ISIS took credit for the murder of two foreigners in Bangladesh in September and October. The government disputes the claims, and analysts are skeptical of organizational links between local and international groups. "But that does not mean local militants won't seize the opportunity if it appears," says Ali Riaz, a Bangladeshi-American political scientist at Illinois State University.

It is a fear that is keenly felt by the bloggers. As Jebtik, the Shahbag blogger who counted Chattopadhya among his friends, puts it: "We are the last defense line between the progressive Bangladesh and the Islamist, terrorist Bangladesh." □

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Travel insurance: no longer just for the overprepared

By Bill Saporito

LAST YEAR A FRIEND SLIPPED AND broke her ankle the day she was scheduled to travel to Paris. Instead of a trip to the Louvre, she took a trip to the hospital. She had to cancel her flight on OpenSkies, owned by British Airways. OpenSkies was not very openhearted: it offered her a small credit on a future flight but made her pay the full fare for the one she missed.

This is exactly what travel insurance is designed for, not to mention a hurricane or a blizzard that shuts down the Eastern seaboard and strands tourists for days. But travelers still hesitate. "In general only 20% of the people who are eligible and should be buying travel insurance do buy it," says Dean Sivley, president of Berkshire Hathaway Travel Protection. Why? In the past, insurance was overpriced and overcomplicated. That's rapidly changing as insurers try to capitalize on shifts in aviation.

Berkshire is one of the newer players in the $3 billion leisure-travel-insurance market, which includes web outfits like Protect Your Bubble and traditional players such as Allianz, Nationwide and AIG's Travel Guard. These companies are offering more à la carte options that let you protect against inconveniences such as flight delays, cancellations and broken connections. You can even buy coverage that lets you call the whole thing off if you are hauled into an unexpected business meeting, your travel partner bails or you simply change your mind.

Berkshire is trying to expand the market by automating the process with an app called AirCare. Open an account and you can buy a basic AirCare policy for domestic ($34) or foreign ($46) flights that pays out automatically if your trip is cancelled or delayed by two hours. Berkshire and others also offer concierge services: if you get stuck, they'll rebook or find a hotel for you so you're not left waiting on a queue.

Insurance isn't becoming just more available and affordable—it's also more necessary. That's because individuals now bear more of the risks of travel. For instance, airlines have transferred capacity risk—that is, filling seats—to travelers in the form of nonrefundable tickets. Likewise, if bad weather grounds a jet in Atlanta and leaves you stranded in Charlotte, N.C., for your flight to Phoenix: tough, you're on the hook for the hotel. If you fly out of New York City, Chicago or Dallas–Fort Worth, you can count on being late 25% of the time.

Travel insurance makes more sense the more you have at risk—say, if you are about to spend a large amount on a once-in-a-lifetime journey. (Check your medical insurance before you leave: it might not get you out of certain countries if you get sick.) Typically, protection runs 4% to 8% of the trip's total cost, depending on the age and destination of the traveler—the older or bolder you are, the higher the price. Travel Guard's basic plan for a $5,000 trip to Paris costs $144 for a 30-year-old; its gold plan for the same trip is $190. Protect Your Bubble's deluxe plan, at $262.50, adds $100,000 in medical coverage and $250,000 for emergency evacuation, for instance. Make sure you understand all the coverage definitions—say, what constitutes a medical reason for canceling. They are spelled out clearly in the fine print.

As has happened in airline booking, aggregation has come to travel insurance. InsureMyTrip.com and SquareMouth.com allow you to pick and choose among already vetted carriers, including HTH, InsureandGo USA, April, RoamRight and Seven Corners. You check off the coverages you want and get a menu of competing offers. Recently, I used SquareMouth.com to insure a multicity domestic trip for two for $91.50 with CSA Travel Insurance, including coverage for trip cancelation, interruption, delay and weather. (Everything went smoothly, natch.)

Buying travel insurance is a lot like packing. Do you want to take that extra sweater or raincoat, just in case? My travel risk tolerance has been fairly high, so I've never bought insurance. Experience has taught me how to deal when the airline spit hits the turbofan. But there is so much spit in the air these days that I am more apt to pack that raincoat after all. □

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LightBox

Treading water

The ruins of a 16th century church emerged from a reservoir in the Mexican state of Chiapas in October amid drought conditions. Reservoir levels dropped 82 ft. (25 m) to reveal the Temple of Santiago, also known as the Temple of Quechula. The church had been submerged since 1966.

Photograph by David von Blohn—AP

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The View

'PEOPLE WANT TO KNOW THAT THEY MATTER … THAT'S A LOT OF WHAT SOCIAL MEDIA TRADES ON.' —PAGE 26

A controversial new restaurant policy is raising questions about the merits of tipping

ECONOMY

Why some restaurants have declared war on tipping

By Ben Goldberger

THE STRIP STEAK AT NEW YORK City's Union Square Café costs $35. But if you order it, you're almost certain to pay closer to $40—and possibly more if you found the server appealing or she introduced herself by name or suggested a great wine. That's because for nearly 150 years, eating out in America has meant leaving a not-insubstantial tip on the check. (The national average is 15% to 20%.)

But what if it didn't? A small but prominent group of restaurants across the U.S. are testing that premise, eliminating tipping and making up for the lost cash by raising prices or adopting a service-included charge. They account for a tiny fraction of the nation's more than 230,000 full-service restaurants, but their ranks are growing. And the latest addition may be the most influential yet.

In October, Danny Meyer said he would get rid of tipping at 13 establishments owned by his Union Square Hospitality Group by the end of 2016. Meyer is a skilled forecaster: he banned smoking long before it was outlawed and founded Shake Shack ahead of the gourmet-burger boom. If he can ditch tipping and still turn a profit, plenty of others could follow.

"There are a ton of other restaurateurs that are all talking about doing this," says chef Tom Colicchio, who has replaced tips with a service fee during lunch at his New York restaurant Craft. "Danny clearly just blew the cover off."

Why fight a custom in place since the late 19th century, when Gilded Age aristocrats adopted the European

VII

PHOTOGRAPH BY RON HAVIV

practice to flaunt their status? In short: money and control.

The amount we tip is ultimately tied to how much a meal costs. And since prices have been rising, tips have gone up along with them—good news for the waiters, hosts and other staff members who receive gratuities (many of whom are wary of losing that income). But a confusing maze of laws bars most of the people who actually cook your food from sharing in those tips, which has created a vast pay gap. At a high-end restaurant, a waiter can make six figures a year. A line cook at the same place is unlikely to earn more than $35,000.

The abolitionists say that ending tipping will let owners restore some pay balance between the two. "The effort that goes into an amazing bowl of risotto," Meyer says, "should not be diminished next to the effort to pull a cork from a bottle."

Eliminating tips could also help the owners' bottom lines. Even for successful full-service places, profit margins are rarely higher than 3%. Restaurants can better adjust to new federal rules expanding paid sick leave and overtime eligibility, along with minimum-wage increases, if they can use the money that had gone into servers' pockets to cover some of their expenses.

The other big reason owners want to get rid of tipping is the one on which they'll face the most resistance. Many proprietors are tired of patrons' deciding how much their staff makes—especially after they've had a few drinks. The current system relies on customers to determine much of what a server gets paid, since most states have a lower minimum wage for workers who receive tips. And their methodology is not exactly rigorous. Although most Americans say they tip as a reward for good service, multiple studies have shown that that actually has little bearing. What does increase tips? Displays of warmth and affection, for one. A light touch, smiling widely, squatting by a table instead of hovering over it, and writing "thank you" on the check have all been found to measurably boost tips. Meanwhile, subjective views of age, gender and race can heavily influence what diners give.

"The responsibility of creating income should not fall to the whim of people who are patronizing the restaurant, which is completely antithetical to a profession," Meyer says. "You don't tip your doctor if she cures you, and you don't tip your architect if the house doesn't fall down."

But the practice won't go down without a fight. Tipping has a powerful hold in America, partly because we see it as our right, a way to reward hard work and punish laggards. Mark Bodenstein found that out when he ended tipping at his restaurant in Covington, Ky., NuVo, in June. "It was literally like we were offending people," Bodenstein says. After Labor Day, he brought tips back. □

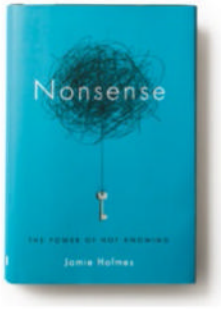
VERBATIM

'I love the Internet because it helped me discover everything that matters to me. But I also hate the Internet because every piece of true pain I've experienced as an adult—with the exception of death in the family and breakups—has come from it.'

LENA DUNHAM, *Girls* star, criticizing the negativity that has become commonplace on blogs and social media

NUTSHELL

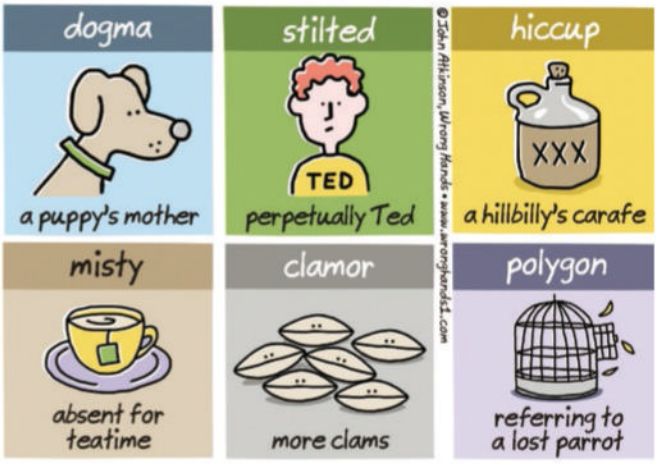
Nonsense



HUMANS ARE hardwired to hate uncertainty; we're constantly trying to find "sure things" to help us succeed. But ironically, Jamie Holmes argues in his new book, this aversion to ambiguity often hinders our ability to make the best decisions. In medicine, for instance, one study found that doctors who acknowledged that their patient had unclear symptoms would nevertheless order a definitive test or prescription 77% of the time—often without asking follow-up questions. (Holmes cites similar confirmation biases in everything from grocery shopping to marriage proposals.) How can we combat this impulsive desire for resolution? For starters, Holmes writes, we should be open to second-guessing ourselves. This is especially true in schools, where teachers should encourage students to take the unfamiliar side of an argument or tackle a problem riddled with errors—all in an attempt to hone their critical-thinking skills. After all, Holmes writes, "sometimes the illusion of knowing is more dangerous than not knowing at all."—SARAH BEGLEY

CHARTOON

Phonetically defined



JOHN ATKINSON, WRONG HANDS

BREAKTHROUGH

A metal that's (almost) lighter than air

The world's lightest metal contains barely any metal at all—in fact, it is made of 99.99% air. Called a microlattice, the material is a three-dimensional grid of tiny tubes that is up to 100 times as light as Styrofoam. And it's poised to revolutionize the way we fly. California-based HRL Laboratories, which has been refining its creation since 2011, is working with the Boeing Co. to create a version for airplanes; it would be half the weight of aluminum but just as strong, greatly improving the planes' fuel efficiency, said Toby Schaedler, senior scientist at HRL. (He expects it to be market-ready within five to 10 years.) NASA is interested in potential applications as well. "They are funding us specifically for a rocket to Mars," says Schaedler. —*Julie Shapiro*

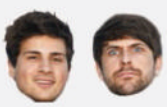
The microlattice is similar to human bone: solid on the outside for strength and porous on the inside for lightness

ROUNDUP

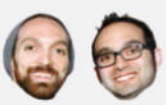
YOUTUBE MILLIONAIRES

Forbes recently released its first ranking of the video platform's most successful stars. Here's who topped the list:

PEWDIEPIE
The 26-year-old native of Sweden (real name: Felix Kjellberg) made $12 million by cracking jokes while playing video games, a popular YouTube genre.



SMOSH
Anthony Padilla, 28, and Ian Hecox, 27, were one of YouTube's first comedy duos; they earned $8.5 million off their video sketches and a feature film.



FINE BROTHERS
Benny and Rafi Fine made $8.5 million off their hit series showing kids reacting to pop-culture artifacts like Nirvana and the NES.

LINDSEY STIRLING
The 29-year-old musician pulled in $6 million touring and releasing music as a self-styled "dubstep violinist," all without signing to a major label.
—*Victor Luckerson*

DUNHAM, PEWDIEPIE, SMOSH, FINE BROTHERS, LINDSEY STIRLING: GETTY IMAGES; METAL: DAN LITTLE PHOTOGRAPHY/HRL LABORATORIES

Why it's easier than ever to get great advice—if you know where to look

By Lily Rothman

THERE ARE MORE THAN 64 MILLION GOOGLE RESULTS FOR the question, "What should I do?" Unfortunately for those asking, whether the problem comes down to career, love, family or plain old personal angst, that's one of the few queries a search engine can't really answer.

Now more than ever, though, there are other options—namely, advice experts. What was once an art form largely confined to syndicated newspaper columns is now a thriving industry, spanning not only written Q&As, but also live chats, apps, videos and audio. On iTunes, for example, there are hundreds of podcast episodes with titles like "Being Around My Parents Is Awkward" and "How to Handle Rejection From Women." And that's just the tip of the adviceberg. Columnists too have become a reliable traffic draw on the sites that host them, with their work frequently topping "most read" story lists. And veteran writers—such as Judith Martin (Miss Manners) and Emily Yoffe (Dear Prudence)—are now joined by celebrities (Molly Ringwald just wrapped up a year as the *Guardian*'s "agony aunt"). Some are also moving to new mediums (Cheryl Strayed now co-hosts a *Dear Sugar* podcast), and new writers have been drawn to the visibility of the genre.

We have entered a new golden age of advice.

It would be easy to credit the Internet alone for this shifting tide. It's simpler than ever to ask for advice—no walks to the mailbox required—so there are naturally more people trying to give it. And social media is full of social hazard, creating a whole new realm of etiquette and ethics.

But there are deeper psychological and social factors at play. At its core, says the writer Allison Wright, who's working on a book on this topic, "advice is always about assimilation"—about trying to find the best way to accomplish something within the confines of your society. For decades, this meant following a set of clearly articulated mores, championed by the likes of Dorothy Dix and Emily Post. At their best, they were guidelines that enforced kindness; at their worst, they were ways to preserve an exclusive social hierarchy.

Today, however, there just aren't as many rules. In a country as diverse as America, where social norms are constantly being challenged and redefined, there's no one right way for a given type of person—employee, friend, parent or partner—to act. (Unless it's a question of whether you should write a thank-you note. The correct answer is always "yes.") This is overwhelmingly a good thing; it means we're embracing our differences, instead of snuffing them out.

HOW OUR ASKS HAVE EVOLVED

1690s

London bookseller John Dunton launches the *Athenian Mercury,* home to what's widely regarded as the first advice column—though we might not recognize it as one today. Answering **questions about the ways of the world,** as well as personal matters, was a way to hook new customers in a reading climate where books and newspapers were becoming more widely available.

"Pray what is the Reason of the Difficulty of determining the height of the Atmosphere . . ."

1896

Elizabeth Meriwether Gilmer acquires the pseudonym Dorothy Dix to become a journalist. In 1917 she'd launch the syndicated advice column that made famous a long-dominant model of the medium: a sophisticated and pseudonymous woman columnist dispenses authoritative advice on **matters of society and sentiment.** By 1920 she was the world's best-paid female writer.

"A woman who is the mother of daughters asks me how I stand on the chaperone question . . ."

"How is a guy supposed to know if a girl is cold, playing hard-to-get or just nice?"

1940s–'50s

At a time when the advice column was a common enough form for Nathanael West to have skewered it in his 1933 novel *Miss Lonelyhearts,* twins Eppie Lederer and Pauline Phillips—as Ann Landers and Abigail Van Buren of "Dear Abby," respectively—keep things lively by answering **personal questions** with wisdom, wit and a real-world rivalry. ("Dear Abby" still exists, now written by Phillips' daughter.)

1980s

Following a fallow period—the old standby was for squares by the time the '70s rolled around, and author Allison Wright says some publications had to produce advice queries in-house—the conservative 1980s brings **a new concern about manners and propriety.** Judith Martin, writing as Miss Manners, is a go-to guru (and a TIME cover subject in 1984).

"How do you politely tell someone that he is your house guest rather than your roommate?"

DIX: AP; ABBY; MANNERS; SAVAGE; MANE; W.K.: GETTY IMAGES

It also means that people need more help to chart their courses. When Dan Savage started "Savage Love" in 1991, he frequently received queries that, today, a quick online search would resolve. Nowadays, he says, it's all situational ethics: "Every letter is in gray areas. And a minefield. A gray minefield." The Washington *Post*'s Carolyn Hax agrees. "Since there are no footsteps painted on the floor for me to dance to," she says people want to know, "How do I work this out?"

Of course, many of the new gurus offering to help may well be hacks doling out bad or misinformed advice for the sake of personal gain. But those types usually don't last long, says Savage. After all, a genre that relies on constant questions comes with a built-in defense mechanism: if readers don't like or trust what they hear, they can—and do—move on.

Historians of the future, looking to these exchanges for answers, will see the mistakes we made. We had misguided text conversations and overzealous weddings, and we allowed social media to warp our perception of reality. But they'll also see that we wanted satisfaction, whatever that meant. We wanted to be ourselves. And that sometimes, to figure things out, we needed to ask for help—from those we knew and loved, and from the people we called "Dear." ◻

"Would it be right of me to tell him to quit rapping since his friends are afraid to do so?"

1990s

With many social mores relaxing—and before widespread access to search engines became available—some columnists started answering *Athenian Mercury*–style **factual questions, but often with an R-rated twist.** Dan Savage says the early days of his "Savage Love" column, which he launched in 1991, included frequent requests for definitions and referrals.

Today

Heather Havrilesky of "Ask Polly" likens the state of the genre to something she observed as a TV critic in the early 2000s. Back then, excitement about the quality of television drew some of the smartest, wittiest writers to episode recapping. Now many of them are doling out advice, alongside noteworthy newcomers like hip-hop artist Gucci Mane (answering **questions about rapping, relationships and more**) and author Haruki Murakami.

"Do you know of any clubs or organizations that cater to such an interest [in sex with amputees]?"

What's on our minds?

We asked some of today's most prolific advice experts to tell us about the questions and issues that define our age. Here's what they said:

TECHNOLOGY

'It does all this great stuff for us, but it also causes trouble in our romantic and personal lives.'

CHERYL STRAYED of *Dear Sugar*

SELF-WORTH

'People want to know that they matter in some fundamental way. That's a lot of what social media trades on. The truth is, that can be a very hollow arrangement.'

STEVE ALMOND of *Dear Sugar*

MEDIOCRITY

'We have so much access to so many success stories that I think it becomes extremely difficult for an average person just to exist.'

HEATHER HAVRILESKY of *New York* magazine's "Ask Polly"

MONEY

'The No. 1 etiquette problem I have been dealing with for a number of years now is blatant greed.'

JUDITH MARTIN, a.k.a. Miss Manners

SEX

'Increasingly, straight people are questioning the default setting in straight relationships, where monogamy is just assumed.'

DAN SAVAGE of "Savage Love"

PURPOSE

'[People] don't even know what they'd like if they could have it. There's a sense of being completely lost in life.'

ANDREW W.K. of the *Village Voice*'s "Ask Andrew W.K." ›

THE CURIOUS CAPITALIST

Walmart's woes suggest a bumpy road for the American and global economies

By Rana Foroohar

WALMART IS THE WORLD'S LARGEST RETAILER. IT IS ALSO the biggest canary in the coal mine that is the global economy. And when that bird tweets, it has consequences.

Consider Walmart's Oct. 14 announcement of a profit dip and lackluster sales, which was followed by the steepest plunge in 27 years in the Bentonville, Ark.–based firm's stock. In some ways, Walmart's woes are all its own. The behemoth has been especially slow to embrace e-commerce, losing market share to Amazon, among other retailers. But in more important ways, Walmart's slump speaks to fundamental trends in the global economy right now—stagnant wages, technological disruption, a slowing China and low commodities prices. All of these forces are coagulating in a disinflationary stew that is making it tougher for all companies, and thus the economy as a whole, to grow.

Inflation, not deflation, is usually the economic term that gets economists anxious. That's because when prices rise, purchasing power declines and life gets harder for most people. Seven years after the financial crisis, with trillions of dollars having been poured into the global economy by central bankers, you'd expect there to be more growth and inflation. But inflation in the real economy is barely above zero—and that's the problem. Too little inflation is a sign of a weak economy. That is exactly what recent statistics tell us we still have: the September jobs report was disappointing, and wage growth continues to be meager. In such a disinflationary environment, companies can't raise prices and consumers—who rightly believe that goods may be cheaper tomorrow than they are today—wait to make their purchases. And that slows growth all around.

WALMART IS IN A PARTICULARLY TOUGH SPOT because it recently made some important decisions predicated on more inflation rather than less. In February, the company made the highly publicized move to raise wages by $1 an hour and spend more on training. Management also said it would invest more in its e-commerce operation. Both are needed. Analysts like Michael Lasser at UBS say that poorly trained, and deployed, labor is one reason Walmart sales have declined. "If a consumer takes the time to go to a [physical] store these days and has a poor experience, it's just very easy for them to go elsewhere," he says.

But these decisions were made when consumer confidence was rising and the outlook for the economy was brighter. Since then, the Gallup U.S. Economic Confidence Index has plunged and economists have revised growth expectations downward. Meanwhile, Walmart's push to improve e-commerce is a reminder of the disruptive effect that technology has been having across the economy as a whole.

Amazon, for example, is well known for grabbing market share by giving up profit margin. That's another way of saying keeping prices low. That's only the most visible example of how technology has been further driving down the price of almost every variety of goods and services. While antiquated government data-tracking methods more suited to the age of rotary phones make it impossible to quantify the precise price effect of technology, it's a safe bet that the overall impact is not inflationary. In any case, tech's relationship with prices is something that has begun keeping everyone from top economists to executives like Google's Larry Page up at night.

ALL THIS DISRUPTION is coming at a time when most of the other factors in the global economy favor disinflation as well. The slowing economy in China means that policymakers there will likely let its currency drop in value further, adding downward price pressure to the cost of both labor and exports. And when China and other emerging markets tap their brakes, they put downward pressure on commodities. That can have some benefit for consumers in the form of lower gas prices but makes it tougher for firms like Walmart to turn a profit. "We've seen some pretty big deflationary headwinds in areas like food, which means we couldn't make any price hikes this year, and that has affected [sales]," says Walmart spokesman Randy Hargrove. "We expect that trend to continue through 2016."

The problem for consumers in the U.S., and many others around the world, is that lower food and gas prices don't make up for virtually flat wages. Walmart's real problem, one that is shared by the economy at large, is that even at this point in the recovery, consumers simply don't have more money to spend. If the fortunes of the world's largest retailer are an indication, that won't change anytime soon. ◻

DOWNWARD PRESSURE

$866

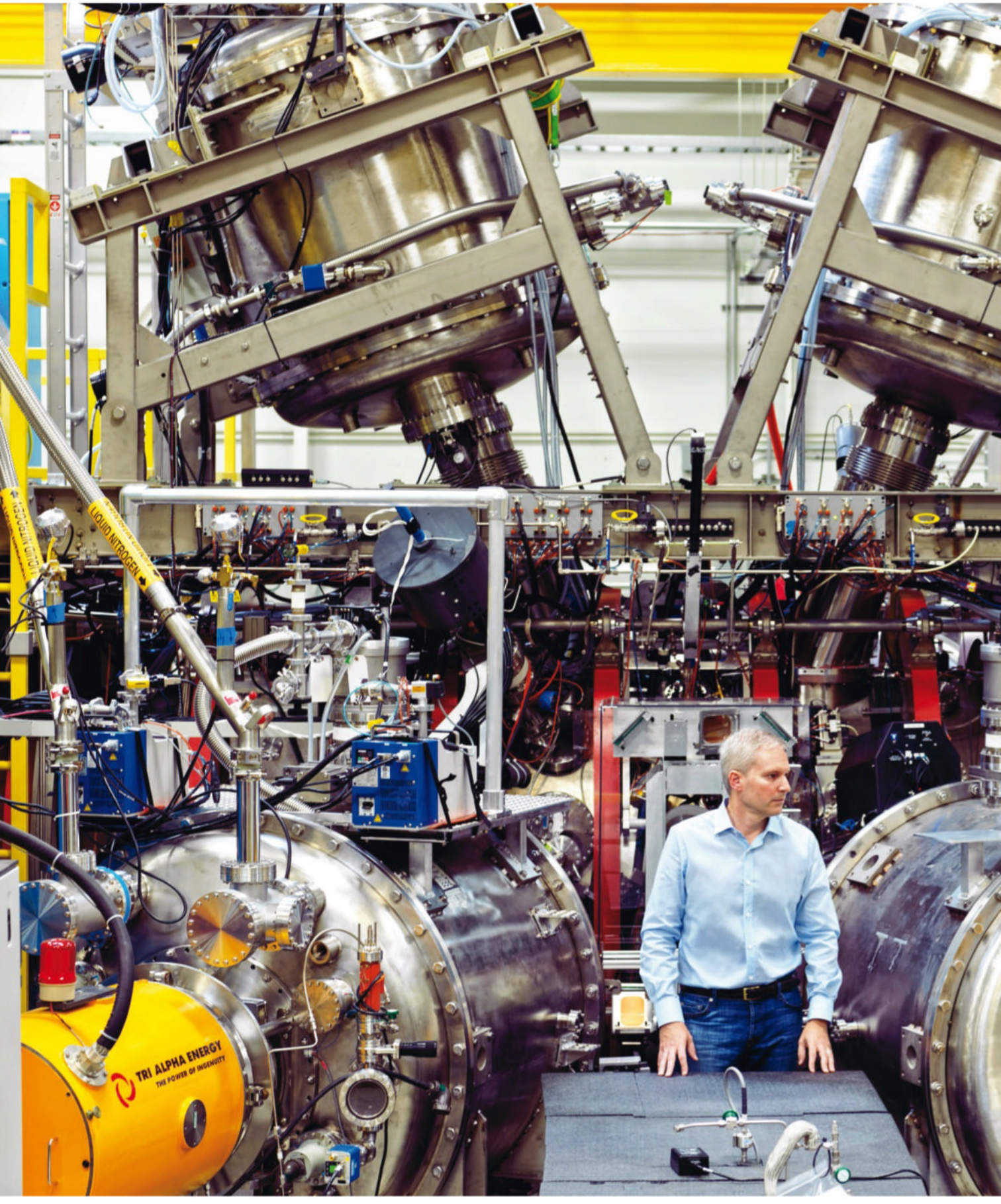
Average weekly earnings for all workers in September, up 2.2% from September 2014; weak wage growth keeps consumers from spending more freely and boosting the economy

58%

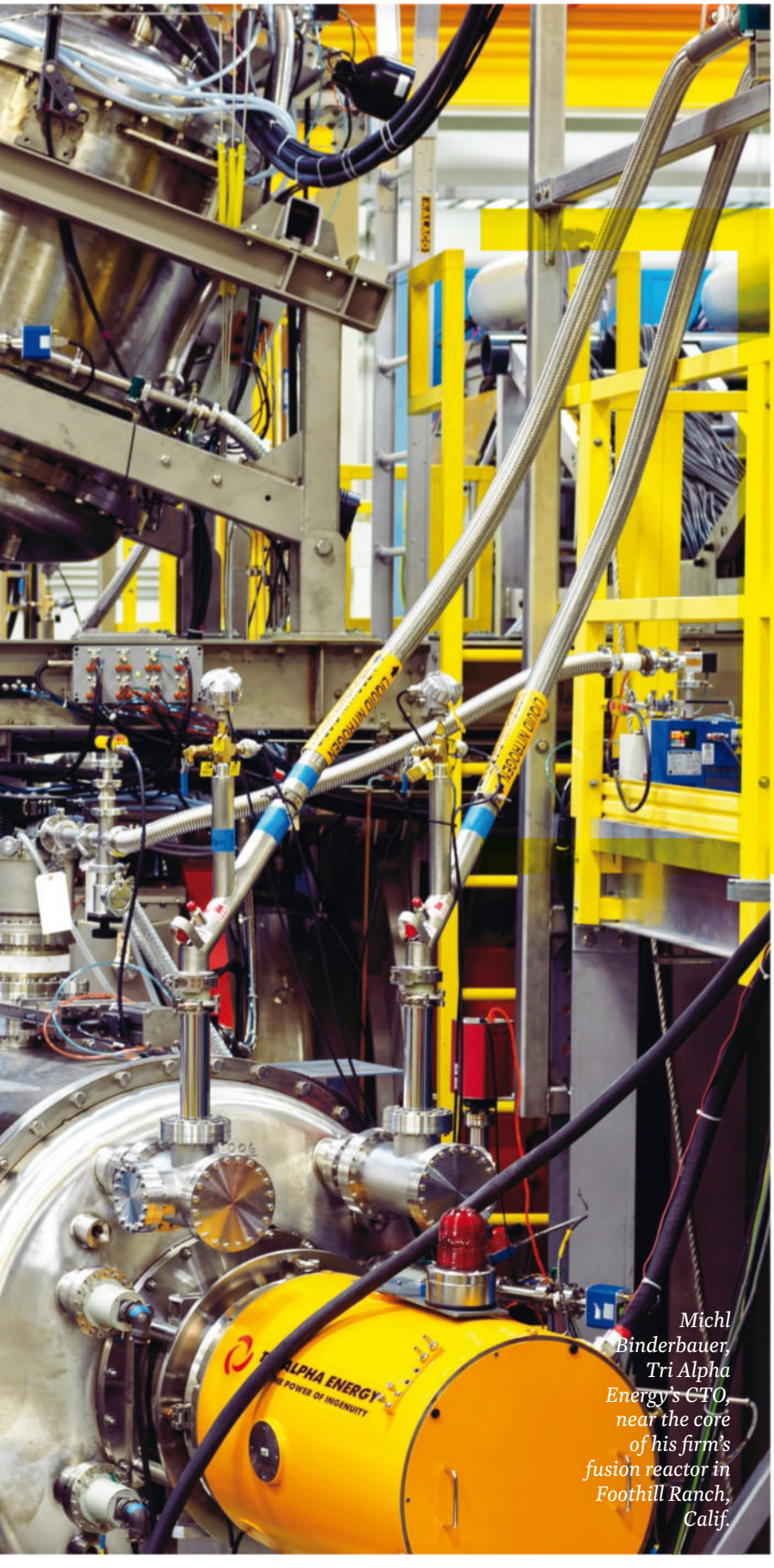
Share of respondents to a Gallup survey in September who said that the economy is "getting worse," a jump from the 45% who said so in January

SOURCES: BLS; GALLUP

Premature birth is the #1 cause of death in children under 5.
Alfred survived. Each year, more than a million babies don t.
World Prematurity Day
November 17
Alfred, born at 32 weeks, weighing 2.6 lbs
march of dimes
Help us fight premature birth at
facebook.com/marchofdimes
© 2015 March of Dimes Foundation
Photo by Anne Geddes ©
Anne Geddes



PHOTOGRAPH BY VINCENT FOURNIER FOR TIME



Michl Binderbauer, Tri Alpha Energy's CTO, near the core of his firm's fusion reactor in Foothill Ranch, Calif.

A STAR IS BORN

Startup companies are rebooting the quest for clean energy's holy grail: fusion

By Lev Grossman

Hydrogen, the universe's most abundant element, is the fuel for any potential fusion reactor

THE MACHINE lives in a white building in an Orange County office park so uninteresting-looking that not even the person who's supposed to be taking me there can find it. We literally drive right past it and have to double back.

Though there are a few clues if you look closely. A towering silo of liquid nitrogen out back. A shed that turns out to be full of giant flywheels for storing energy. The machine, which is the size of a small house, draws so much juice that when they turn it on they have to disconnect from the public grid and run off their own power to keep from shorting out the whole county. If you had X-ray vision you might notice that all the iron rebar in the building's foundations has been pulled out and replaced with stainless-steel rebar, because iron is too magnetic.

The machine is a prototype fusion reactor. It is the sole product of a small, secretive company called Tri Alpha Energy, and when it or one like it is up and running, it will transform the world as completely as any technology in the past century. This will happen sooner than you think.

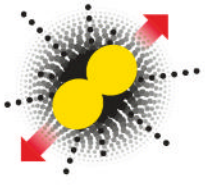
It's not the world's only fusion reactor. There are several dozen scattered around the globe in various stages of completion. Most of them are being built by universities and large corporations and national governments, with all the blinding speed, sober parsimony and nimble risk taking that that implies. The biggest one, the International Thermonuclear Experimental Reactor, or ITER, is under construction by a massive international consortium in the south of France, with a price tag of $20 billion and a projected due date of 2027. Fusion research has a reputation for consuming time, money and careers in huge quantities while producing a lot of hype and not much in the way of actual fusion. It has earned that reputation many times over.

But over the past 10 years, a new front has opened up. The same engine of raging innovation that's been powering the rest of the high-tech economy, the startup, has taken on the problem of fusion. There is now a stealth scene of virtually unknown companies working on it, doing the kind of highly practical rapid-iteration development you can do only in the private sector. They're not funded by cumbersome grants; the money comes from heavy-hitting investors with an appetite for risk. These are companies most people have never heard of, like General Fusion, located outside Vancouver, and Helion Energy in Redmond, Wash. Tri Alpha is so low profile, it didn't even have a website until a few months ago. But you've probably heard of the people who invest in them: Bezos Expeditions, Mithril Capital Management (a.k.a. PayPal co-founder Peter Thiel), Vulcan (a.k.a. Microsoft co-founder Paul Allen), Goldman Sachs.

The endgame for these companies isn't acquisition by Google followed by a round of appletinis. It's an energy source so cheap and clean and plentiful that it would create an inflection point in human history, an energy singularity that would leave no industry untouched. Fusion would mean the end of fossil fuels. It would be the greatest antidote to climate change that the human race could reasonably ask for. Saving the world: that is the endgame.

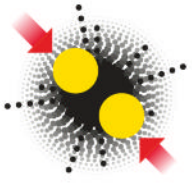
FISSION VS. FUSION

FISSION



The splitting of the nucleus of an atom into smaller parts. The process releases enormous energy and radiation.

FUSION



The merging of atomic nuclei. It's the same process that happens within stars. Getting it hot enough and containing the reaction are why it's so hard to do on earth.

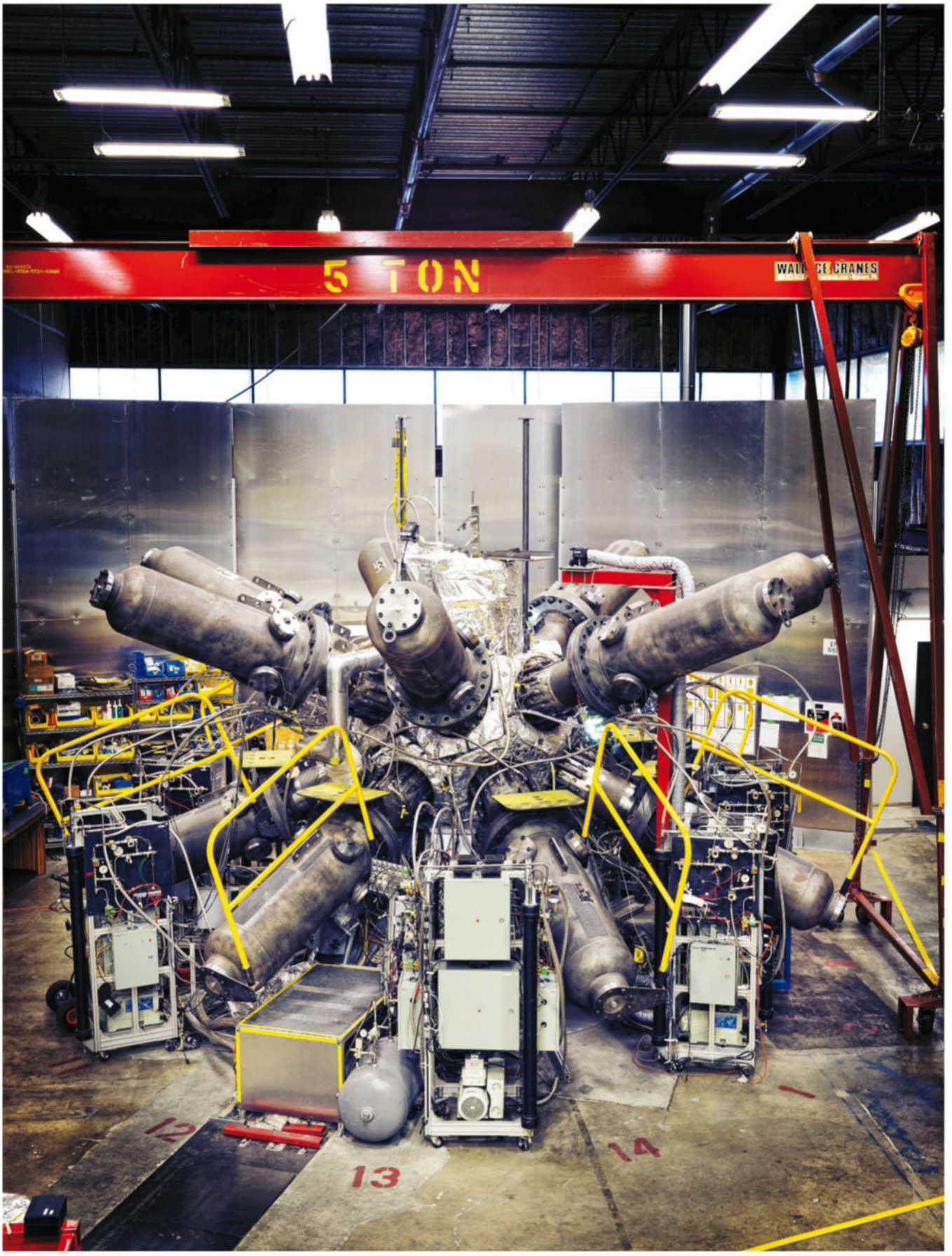
MICHL (YOU SAY IT LIKE MICHAEL) Binderbauer is one of the co-founders of Tri Alpha and its current chief technology officer. He has a Ph.D. in physics from U.C. Irvine. At 46, Binderbauer is charismatic and ultra-focused: he can talk about plasma physics, lucidly and without notes, apparently indefinitely. (We took a break after two hours.) The logical force of his arguments is enhanced by his radiant self-confidence, a trait that the fusion industry seems to select for, and by his Austrian accent—he grew up there—which inevitably reminds one of the Terminator.

Binderbauer's confidence is infectious. Tri Alpha is probably the best-funded of the private fusion companies—to date it has raised hundreds of millions, according to a source close to the company, which is a lot of money but a tiny fraction of what's being spent on the big government-funded projects.

One of the challenges for anybody working on fusion is that people have been talking about it way too much for way too long. The theoretical underpinnings go back to the 1920s, and serious attempts to produce fusion energy on Earth have been going on since the 1940s. Fusion was already supposed to save the world 50 years ago. "All of us fantasize about such things," Binderbauer says. "It seems like it is the answer, so when someone says anything in that field, it usually very quickly exponentiates to a message of, Progress is already almost done. It gets hyped to a level I think is very dangerous." (That's one reason fusion scientists don't love talking to journalists.)

Fusion also gets mixed up, for obvious reasons, with nuclear fission, which is the kind of nuclear power we have now, though in fact they're very different animals. Nuclear fission involves splitting atoms, big ones like uranium-235, into smaller atoms. This releases a lot of energy, but it has a lot of drawbacks too. Uranium is a scarce and finite resource, and nuclear plants are expensive and hazardous—Three Mile Island, Chernobyl, Fukushima—and produce huge quantities of toxic waste that stays hazardously radioactive for centuries.

Nuclear fusion is the reverse of nuclear fission: instead of splitting atoms, you're squashing small ones together to form bigger ones. This releases a huge burst of power too, as a fraction of the mass of the particles involved gets converted into energy (in obedience to Einstein's famous $E=mc^2$). Fusion has a vaguely science-fictional reputation, but in fact we watch it happen all day every day: it's what makes



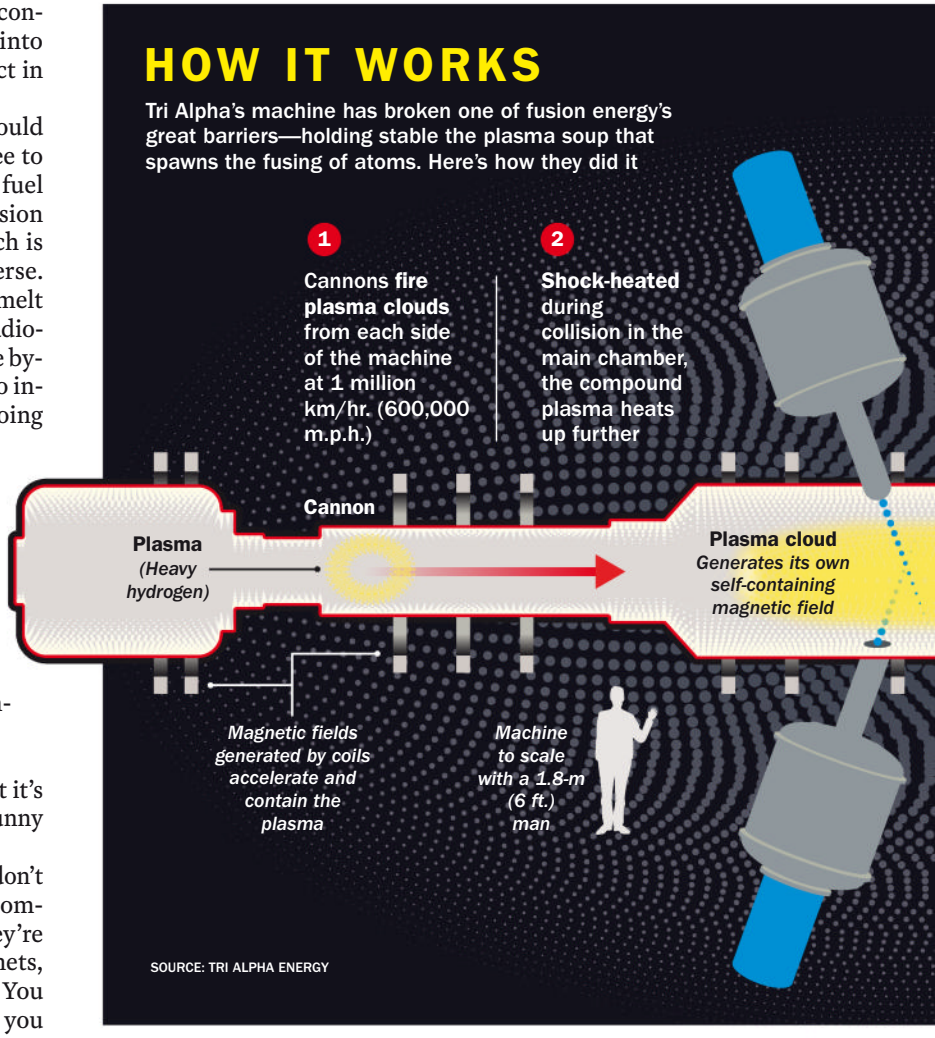
General Fusion's prototype at company headquarters in Burnaby, Canada

VINCENT FOURNIER FOR TIME

the sun shine. The sun is a titanic fusion reactor, constantly smooshing hydrogen nuclei together into heavier elements and sending us the by-product in the form of sunlight.

As an energy source, fusion is so perfect, it could have been made up by a child. It produces three to four times as much power as nuclear fission. Its fuel isn't toxic, or fossil, or even particularly rare: fusion runs on common elements like hydrogen, which is in fact the most plentiful element in the universe. If something goes wrong, fusion reactors don't melt down; they just stop. They produce little to no radioactive waste. They also produce no pollution: the by-product of fusion is helium, which we can use to inflate the balloons for the massive party we're going to have if it ever works.

Daniel Clery puts the contrast with conventional power starkly in his excellent history of fusion, *A Piece of the Sun:* "A 1-GW coal-fired power station requires 10,000 tonnes of coal—100 rail wagon loads—every day. By contrast … the lithium from a single laptop battery and the deuterium from 45 liters of water could generate enough electricity using fusion to supply an average U.K. consumer's energy needs for 30 years."



THE RUNNING JOKE about fusion energy is that it's 30 years away and always will be. It's not a very funny joke, but historically it's always been true.

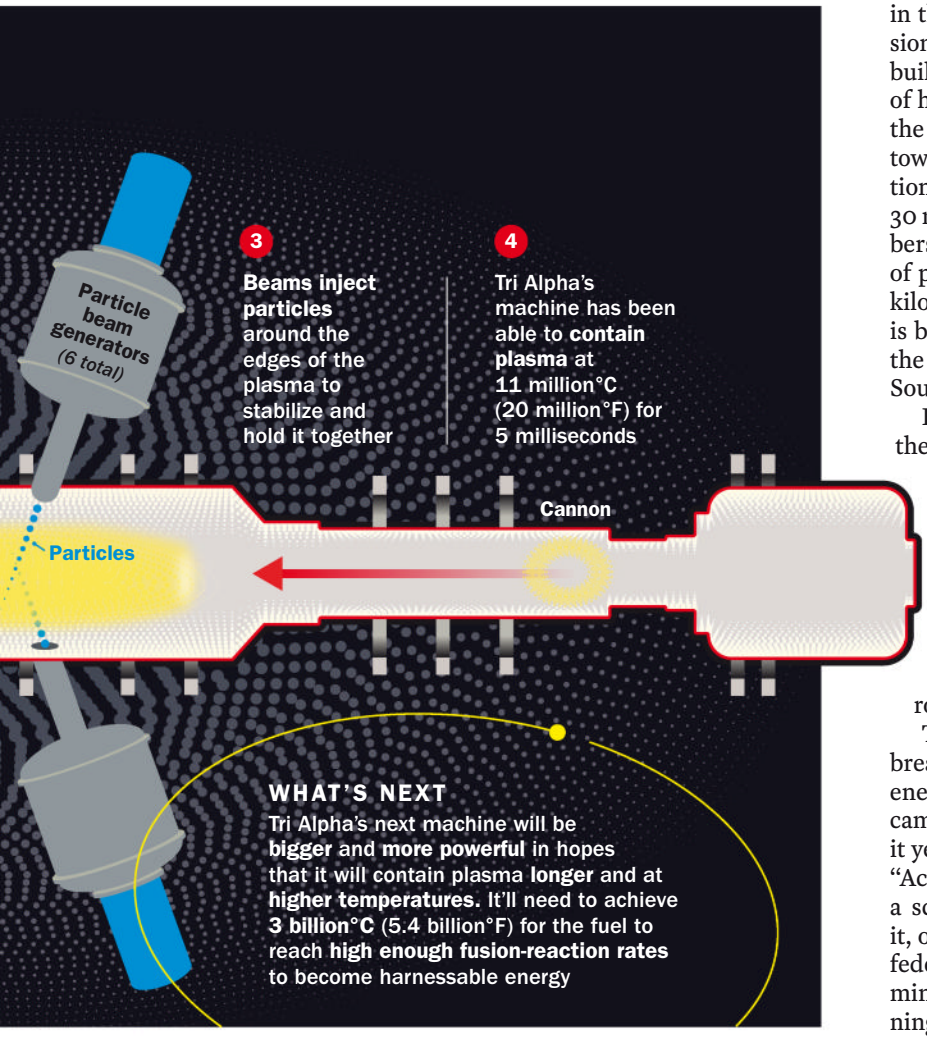
What makes fusion hard is that atomic nuclei don't particularly want to fuse. Atomic nuclei are composed of protons (and usually neutrons), so they're positively charged, and as we know from magnets, things with the same charge repel each other. You have to force the atoms together, and to do that you have to heat them up to the point where they're moving so fast that they shake off their electrons and become a weird cloud of free-range electrons and naked nuclei called a plasma. If you get the plasma really hot, and/or smoosh it hard enough, some of the nuclei bang into each other hard enough to fuse.

The heat and pressure necessary are extreme. Essentially you're trying to replicate conditions in the heart of the sun, where its colossal mass—330,000 times that of Earth—creates crushing pressure, and where the temperature is 17 million degrees Celsius. In fact, because the amounts of fuel are so much smaller, the temperature at which fusion is feasible on Earth starts at around 100 million degrees Celsius.

That's the first problem. The second problem is that your fuel is in the form of a plasma, and plasma, as mentioned above, is weird. It's a fourth state of matter, neither liquid nor solid nor gas. When you torture plasma with temperatures and pressures like these, it becomes wildly unstable and writhes like a cat in a sack. So not only do you have to confine and control it, and heat it and squeeze it; you have to do all that without touching it, because at 100 million degrees, this is a cat that will instantly vaporize solid matter.

You see the difficulty. Essentially you're trying to birth a tiny star on Earth. "It comes down to two challenges," Binderbauer says. "Long enough and hot enough." In other words: Can you keep your plasma stable while you're getting it up to these crazy temperatures? The severity of the challenge has given rise to some of the most complex, most extreme technology humans have ever created.

Take for example the National Ignition Facility (NIF) at Lawrence Livermore National Laboratory, outside San Francisco. A 10-story building with a footprint the size of three football fields, the NIF houses one of the most powerful laser systems in the world: 192 beams of ultraviolet light capable of delivering 500 trillion watts, which is about 1,000 times as much power as the entire U.S. is using at any given



moment. All that energy is delivered in a single shot lasting 20 billionths of a second focused on a tiny gold cylinder full of hydrogen. The cylinder, understandably, simultaneously explodes and implodes, and the hydrogen inside it fuses. This technique is called inertial confinement fusion.

A more common method for creating fusion is by controlling the plasma magnetically. One of the few breaks physicists catch in the quest for fusion is that plasmas are extremely sensitive to electromagnetism, to the point where electromagnetic fields can actually be used to contain and compress them without physically touching them. It's a feat most often performed using a device called a tokamak. (The word is a Russian acronym.) A tokamak is a big hollow metal doughnut wrapped in massively powerful electromagnetic coils. The coils create a magnetic field that contains and compresses the plasma inside the doughnut.

Since they were developed in the Soviet Union in the 1950s, tokamaks have come to dominate fusion research: in the 1980s enormous tokamaks were built at Princeton and in Japan and England, at a cost of hundreds of millions of dollars. Their successor, the colossus of all tokamaks, is being built in a small town in France outside Marseilles. ITER, the International Thermonuclear Experimental Reactor, will be 30 meters tall and weigh 23,000 tons. Its staff numbers in the thousands. It will hold 840 cubic meters of plasma. Its magnets alone will require 100,000 kilometers of niobium-tin wire. Its stupendous cost is being paid by a global consortium that includes the U.S., Russia, the European Union, China, Japan, South Korea and India.

Because of their extreme size and complexity, and the political vagaries associated with their funding, fusion projects are bedeviled by cost overruns and missed deadlines. The NIF was finished seven years late for $5 billion, almost double the original budget. ITER's estimated date for full power operation has slipped from 2016 to 2027, and even that date is under re-evaluation. Its price tag has gone from $5 billion to $20 billion; for purposes of comparison, the Large Hadron Collider cost $4.75 billion.

The goal for all these machines is to pass the break-even point, where the reactor puts out more energy than it takes to run it. The big tokamaks came close in the 1990s, but nobody has quite done it yet, and some scientists find the pace frustrating. "Academics aren't necessarily good at adhering to a schedule, promising something and delivering it, on budget and on time," Binderbauer says. "The federal process doesn't condition you to live in that mind-set." And even when it does get up and running, ITER will never supply a watt of power to the grid. It's a science experiment, not a power plant. Proof of concept only.

Fusion research is too slow, too cautious, too focused on lavishing too much money on too few solutions and too many tokamaks. "In a university lab the name of the game, the end product, is a paper," says Michel Laberge, founder of General Fusion in Vancouver, who has a Ph.D. in physics. "You want to get to making energy, but it's not the primary goal. The primary goal is to publish a lot of papers, to go to conferences and understand very thoroughly all the little details of what is going on." Understanding is all well and good, in an ideal world, but the real world is getting less ideal all the time. The real world needs clean power and lots of it.

The by-product of fusion is helium, which we can use to inflate the balloons for the massive party we're going to have it if ever works

THE DRIVING FORCE behind the founding of Tri Alpha was a physicist at U.C. Irvine named Norman Rostoker. Rostoker, who died in 2014, was a plasma physicist with both a deep understanding of mathematics and a flair for practical applications. He also had an indomitable will and a pronounced

independent streak—anybody who talks about him ends up using the word *maverick* sooner or later. Binderbauer was one of his protégés.

Even in the early 1990s, Rostoker was skeptical of the tokamak hegemony. In a tokamak, the particles in the plasma move in tight spiral orbits around lines of electric current. But it's hard to keep those particles from being bumped out of their little orbits by electromagnetic turbulence, and when that happens the plasma becomes unstable and loses precious heat. One way scientists fight this instability is by building bigger and bigger tokamaks, but bigger means more complex, and more power-hungry, and more expensive. Rostoker thought there had to be a better way.

He found one in particle accelerators, those colossal rings, like the Large Hadron Collider, that crash subatomic particles into each other. In accelerators, particles travel on wide, conspicuously stable orbits. Rostoker and Binderbauer wondered if you could do something similar in a fusion reactor. They spent a couple of years thinking about it and decided, short answer, probably. "If you can bring accelerator physics into the realm of fusion, you can actually make a better-behaved plasma, one that can give you long timescales," Binderbauer says. "Then you can invest energy and heat it."

Rostoker's other key insight had to do with the flow of people and money around the reactor: he thought the private sector would be a better place to get things done than a university lab. Essentially he recategorized fusion power from an object of lengthy, lofty scientific inquiry to just another product to be shipped. "Fusion is in the end an application, right?" Binderbauer says. "The problem with fusion typically is that it's driven by science, which means you take the small steps. The most predictable next step, the one you're comfortable with. So it doesn't necessarily connect with what you want. Norm said, You've got to look at the end in mind. You've got to unravel it, reverse-engineer it. What would a utility want? What would make sense? And design something from there, and be agnostic as to how hard the physics might be."

Raising money was a challenge: tokamaks were eating up all the grant money, and energy startups are expensive, risky long-term bets, especially to Silicon Valley investors spoiled from flipping web startups for quick paydays. Recruiting was tough too: building a fusion device requires a blended culture of physicists and engineers, two groups who don't historically mix well. For the first few years, the company ran on the brink of insolvency. "You have money for a year or two to develop something, deliver, and go get the next chunk," Binderbauer says. "It's not the academic risk profile."

To keep the pace up they freed themselves from the baggage of theory: as long as something worked, they didn't analyze to death why. The idea was to stay pragmatic and iterate rapidly, spend as little as possible and not fear failure. "This is one of the failures of the governmental way of running it," Binderbauer says. "It didn't create enough diversity of ideas, and let those freely be pursued to failure. Say, this is where we ultimately want to go, what are the critical steps to get there, what are the risk elements of the path to get there, and can I test for some of these risks without spending a hundred million bucks?"

Some academics would disagree, but no one can deny that Tri Alpha has managed to build a prototype fusion reactor quickly on a tiny budget. The company has a panel of advisers—including Burton Richter, who won the Nobel Prize for Physics in 1976, and Ronald Davidson, past director of fusion labs at both MIT and Princeton—and Binderbauer has fond memories of unveiling his first prototype to them in 2008. "There were like jaws dropping. It was like, holy sh-t, these guys actually did this? On this time frame? This is not possible. Then we had world-record data by August. That was a year basically from seeing dust to seeing physics data taken that's better than anyone else ever did."

Davidson confirms that impression, though in less colorful language. "In the framework of a Department of Energy laboratory, and also in some universities, the level of regulations and restrictions you have on how you do things is somewhat different than in the industry," he says. "The industry can be quite nimble, relatively speaking, in exploring ideas and testing them for the first time."

TRI ALPHA'S REACTOR is very different from the towering tokamaks that dominate the fusion skyline, or the supervillain lasers of the NIF. You could think of it as a massive cannon for firing smoke rings, except that the smoke rings are actually hot plasma rings, and the gunpowder is a sequence of 400 electric circuits, timed down to 10 billionths of a second, that accelerate that plasma ring to just under a million kilometers an hour.

And there are actually two cannons, arranged nose to nose, firing two plasmas straight at each other. The plasmas smash into each other and merge in a central chamber, and the violence of the collision further heats the combined plasma up to 10 million degrees Celsius and combines them into a single plasma 70 to 80 centimeters across, shaped more or less like a football with a hole through it the long way, quietly spinning in place.

But a fusion reactor's work is never done. Positioned around that central chamber are six massive neutral beam injectors firing hydrogen atoms into the edges of the spinning cloud to stabilize it and keep it hot. Two more things about this cloud: one, the particles in it are moving in a much wider orbit than is typical in, say, a tokamak, and hence are much more stable in the face of turbulence. Two,

ATTEMPTS AT WORKING REACTORS

1957
British researchers test the ZETA fusion reactor, which uses magnetic fields to confine atoms into a small space in hopes that they will fuse.

1968

The Soviet Union tests the doughnut-shaped tokamak, a predecessor to dozens of fusion devices that would be tested over the following decades.

1970S
Development begins on **three large-scale tokamaks in the U.S., Japan and the U.K.** The devices fail to produce more energy than they consume.

2008
Ground breaks on the International Thermonuclear Experimental Reactor (ITER). **Costs have since ballooned to more than $20 billion** from $5 billion.

KEYSTONE FRANCE/GETTY IMAGES

the cloud is generating a magnetic field. Instead of applying a field from outside, Tri Alpha uses a phenomenon called a field-reversed configuration, or FRC, whereby the plasma itself generates the magnetic field that confines it. It's an elegant piece of plasma-physics bootstrappery. "What you get within forty millionths of a second from the time you unleash your first little bit of gas," Binderbauer says proudly, "is this FRC sitting in here, fully stagnant, no more moving axially, and rotating."

The machine that orchestrates this plasma-on-plasma violence is something of a monster, 23 meters long and 11 meters wide, studded with dials and gauges and overgrown with steel piping and thick loose hanks of black spaghetti cable. Officially known as C-2U, it's almost farcically complicated—it looks less like a fusion reactor than it does like a Hollywood fantasy of a fusion reactor. It sits inside a gigantic warehouse section of Tri Alpha's Orange County office building surrounded by racks of computers that control it and more racks of computers that process the vast amounts of information that pour out of it—it has over 10,000 engineer control points that monitor the health of the machine, plus over 1,000 physics diagnostic channels pumping out experimental data. For every five millionths of a second it operates it generates about a gigabyte of data.

In August, Tri Alpha announced that its machine had generated some very interesting data. So far the company's primary focus has been on the long-enough problem, rather than the hot-enough part; stabilizing the plasma is generally considered the tougher piece in this two-piece puzzle. Now Binderbauer believes that they've done it: in June the reactor proved able to hold its plasma stable for 5 milliseconds.

That's not a very long time, but it's an eternity in fusion time, long enough that if things were going to go pear-shaped, they would have. The reactor shut down only because it ran out of power—at lower power, and hence with slightly less stability, they've gone as long as 12 milliseconds. "We have totally mastered this topology," Binderbauer says. "I can now hold this at will, 100% stable. This thing does not veer at all." He didn't live to see it, but Rostoker was right. The cat is in the sack. Tri Alpha has tamed the plasma.

SOME OTHER PEOPLE may be right too. Where fusion is concerned, the private sector supports a robustly diverse range of methodologies. In 2002, Laberge, an intense redhead with a thick French-Canadian accent and a droll sense of humor, realized he'd spent enough of his life designing laser printers. "I decided to start a fusion company," he says. "Which is pretty insane, but that's what I went for. I guess, go big in life."

Laberge too was skeptical of the monoculture that dominated fusion science. "The thing in fusion is, when they started they tried many different approaches, and then there's one or two that had a bit of success and whatnot, and then everybody jumped on those approaches," he says. "So it is a good hunting ground for new startup companies, to go and see those abandoned efforts." The approach he hit on is called magnetized target fusion: crudely put, you create a spinning vortex of liquid metal, inject some plasma into its empty center, then squeeze the vortex, thereby squeezing the plasma inside it and causing it to heat up and fuse.

Laberge couldn't get enough grant funding, so he took the idea to investors instead and founded General Fusion. Now General Fusion has 65 employees and is one of a small handful of companies racing Tri Alpha to the break-even point. To date it has raised $94 million and built prototypes of the reactor's major subsystems, including a spherical chamber for the liquid metal vortex with 14 huge spikes projecting out at all angles—the spikes are massive hammers that do the squeezing. It looks, if possible, even more like Hollywood's idea of a fusion reactor than Tri Alpha's. "The tokamak people have a very long timeline, which I don't like," Laberge says, "so we'd like to speed that up, and we think we can move faster." Predictions, like comparisons, are invidious, but when coerced he says, "About a decade to producing energy would be a good timeline to have."

Helion Energy, another venture in Redmond, is already on its fourth-generation prototype. Its approach also has two plasmas colliding in a central chamber, but it will work in rapid pulses rather than sustaining a single static plasma. Helion is focused on developing a smaller-scale, truck-size reactor, and doing it as fast as possible. The company's website states in no uncertain terms that it will have a commercial reactor operational within six years. (Helion told us it was too busy building fusion reactors right now to participate in this article.)

And there are others. Industrial Heat in Raleigh, N.C.; Lawrenceville Plasma Physics in New Jersey; Tokamak Energy outside Oxford, England. Lockheed Martin's Skunk Works division is developing what it calls a compact fusion reactor, which it says will fit on the back of a truck. It also says it'll have a working prototype within five years. (And it said that last year, so four to go.)

There's a kind of cheeky underdog defiance in the attitude of the private sector to the public, but the attitude the other way is a bit more collegial. "They're very interesting," says Professor Stewart Prager, director of the Princeton Plasma Physics Laboratory. "Some more than others. There's a range. It's definitely good to see private investment in fusion." Dennis Whyte, director of the Plasma Science and Fusion Center at MIT, understands the impatience that drives the startups. "Their argument is that if the

IS FUSION SAFE?

Yes. Unlike fission, fusion isn't a chain reaction, so it can't run away and melt down. The levels of radiation involved are low, and although it requires extreme temperatures, if any of the plasma got out, its heat would dissipate rapidly and harmlessly into the atmosphere.

science breaks go their way, they will be able to accelerate the pace of getting fusion energy on the grid, and I overall agree with that philosophy," he says. "I'm part of the quote unquote Establishment that they're railing against, but you can sense my frustration, because I'm not happy about the delays and so forth." (He might well be frustrated: Congress has cut funding for MIT's fusion reactor, which will cease operations next year. He's currently focused on designing a smaller, modular reactor that takes advantage of recent advances in superconducting technology.)

Within the private sector, there's a good deal of genial trash talk. The trash talk about Tri Alpha tends to focus on the question of fuel: When you're doing fusion, which atomic nuclei do you fuse? By far the most popular answer is deuterium and tritium, two isotopes of hydrogen. This is fusion's low-hanging fruit, because deuterium and tritium fuse at a lower temperature than any other option, a comparatively mild 100 million degrees Celsius. ITER uses D-T fusion (as it's known), as do the NIF, the National Spherical Torus Experiment at Princeton, Lockheed Martin, General Fusion and almost everybody else.

But there are catches. One is that tritium is rare, so you have to make it. The other is that the reaction emits, along with an isotope of helium, a neutron, which is a problem because when you throw a lot of free neutrons at something it eventually becomes radioactive. That means you're stuck regularly replacing parts of your reactor as they become too hot to handle. Binderbauer is scathing on the subject of D-T fusion. "Let's say you have success on ITER," he says. "You've still got another many decades of materials research to try to make something that lasts more than six to nine months, in the hellish bombardment of neutrons it is going to have to live in."

But there are engineering solutions to the problem: that vortex of liquid metal in General Fusion's reactor will be a mixture of lead and lithium, which will catch the neutrons. As a bonus, when you hit lithium with neutrons, you get tritium. So two birds, one stone.

Helion's reactor will fuse deuterium and helium-3, which produces fewer neutrons, though it requires more heat and raises the problem of finding enough helium-3, which is also rare. Tri Alpha plans to fuse protons (otherwise known as hydrogen nuclei) with boron-11. This reaction produces no neutrons at all, and both elements are plentiful and naturally occurring. "We're always saying, if you want to buy our plant," Binderbauer says, "we'll give you a lifetime supply of fuel for free." The reason hardly anybody else is pursuing it is that proton-boron-11 fusion requires much higher temperatures, insanely much higher: 3 billion degrees Celsius.

No one really knows how plasma will behave at that temperature, and virtually everybody I talked to was skeptical about Tri Alpha's making it work, and considered the engineering challenges of D-T fusion to be vastly preferable. "Fusion is hard already, even when it's D-T, and you have to realize how much harder this is than D-T," says Whyte. "It's O.K. to take a physics leap, but you also don't want it to be so big that you worry about its viability." Laberge felt the same way: "It's like learning to run before you can walk. Or somebody told me it's like learning to fly before you can walk. You can argue that General Fusion is outrageously ambitious trying to do fusion, but Tri Alpha is outrageously *outrageously* ambitious."

Binderbauer, who is not intimidated by anything, is not intimidated by this either. His next move will be to tear down Tri Alpha's current reactor and build a new one that will scale up to the necessary temperatures. He points out that particle accelerators can create temperatures in the trillions. "Going to higher temperatures is not that hard," he says. "It sounds terrible, because it's billions of degrees, but it's not. You use techniques much like what you use in a microwave. They're very similar principles." You have to imagine the Austrian accent to get the full effect.

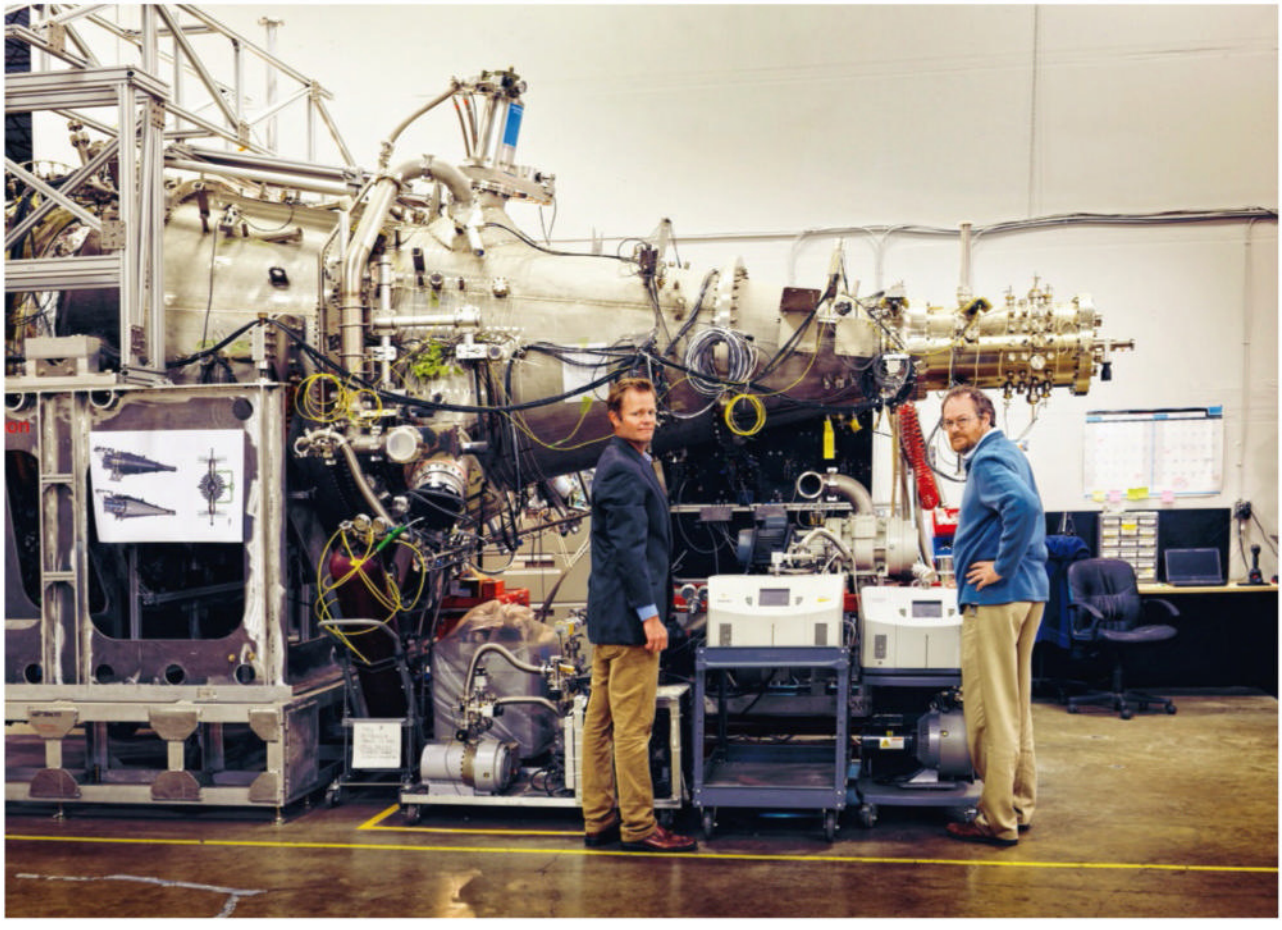
EVERYBODY IN THE FUSION INDUSTRY shares a worldview in which the transformation of the globe by fusion power is imminent. I asked Binderbauer how confident he was that he would see a practical fusion reactor in his lifetime, and his answer was "Very. Scientifically I'm very confident. Now that we have this, this is the foundation." He thinks he understands theoretically what will happen as his machine claws its way up to 3 billion degrees, and the theory tells him it's possible. "There should be no physics that says it won't be. But you gotta test it. This is the field where nature's the ultimate arbiter, so there's some risk there."

Binderbauer's Austrian rigor restrains him, barely, from making brash predictions about when all this is going to happen. "People tell you they'll have a reactor in five years—I know it's impossible. And it's not because I'm negative. I want this too, and we work as fast as we can, but I know it's more than five years. It just is." Try to pin him down on a specific timeline for Tri Alpha and he writhes like a superheated plasma. "It's not true that it takes 30 years and will always take 30 years. It doesn't. I'm not prepared to tell you, *X* is the number of years till we have a commercial reactor here. But I will tell you, we are truly about three to four years from the point where the risk changes from a science risk to an engineering risk. And I can certainly see that within a decade such things can mature to the point where you can have the first commercial steps."

There may be a lot of those steps. The utilities will be the ones making the actual transition, and for fusion to be of any earthly use to anybody it will have

FUSION PAYBACK COMPARED WITH OTHER ENERGY SOURCES

Total energy produced divided by energy required to build and maintain, according to a 2000 study published in *Fusion Engineering and Design*



General Fusion founder Michel Laberge and CEO Nathan Gilliland next to one of their firm's unassembled plasma injectors

to make business and engineering sense to them, because fusion plants will be expensive. Unlike solar or wind, fusion would provide energy constantly, not intermittently, but there would have to be enough of it. The gain (the ratio of energy-out to energy-in) of a commercial fusion plant would have to be in the 15-to-20 range; right now ITER's target gain is 10; to date no fusion reactor has yet reached a ratio of 1, the break-even point. Then there's the question of how exactly to extract that energy from the reactor in the form of heat, so that it can plug into the existing infrastructure.

But those steps would be giant leaps for mankind. Bill Gates is currently on a global campaign trying to raise awareness about how badly our addiction to energy is destroying the environment. He's putting $2 billion of his foundation's money into it. "We need innovation that gives us energy that's cheaper than today's hydrocarbon energy, that has zero CO_2 emissions, and that's as reliable as today's overall energy system," he says in the November issue of the *Atlantic*. "We need an energy miracle." (He personally has invested in TerraPower, a maker of next-generation fission plants.)

'It's not true that it takes 30 years and will always take 30 years. It doesn't.'

Michl Binderbauer, on the feasibility of commercial fusion reactors

To assess the precise probability that fusion will or won't be that miracle is beyond the remit of a journalist without a Ph.D. in plasma physics, but as miracles go, it's looking a lot more plausible than most. Even Prager, head of the Princeton Lab, who considers the claims of the private sector to be overconfident, still believes it's a question of when not if. "I think it's inevitable. And I don't think I'm alone in that. You can't get commercial fusion in 10 years, but I think we'll have commercial fusion, fusion on the grid, in the 2040s. It may sound like a long way away, but in terms of mitigating climate change, fusion will play a very critical role."

Fusion may just turn out to belong to that category of human achievement, like powered flight and moon landings, that appeared categorically impossible right up until the moment somebody did it. At the very least, a lot of very smart people are betting their money and their careers on it. As for the rest of us, we may already have bet the planet. ◻

VINCENT FOURNIER FOR TIME

CAMPAIGN ★ 2016

CARLY FIORINA'S CONVENIENT TRUTHS

Why the GOP's top saleswoman thinks she can win the White House

BY PHILIP ELLIOTT/GRINNELL, IOWA

THE FINGER JABBED ANGRILY TOWARD Carly Fiorina's face. "Stop spreading falsehoods," the older gentleman growled at the White House hopeful. Campaign aides and supporters froze in the Iowa high school hallway. "Don't spread falsehoods," Fiorina's critic repeated, his finger just inches away. "We know what you're doing."

Fiorina had no interest in debating this man, and a supporter told him to move along. Fiorina's confronter shuffled away toward the real reason he was at the high school this Friday evening: the Grinnell Tigers' football game. The marching band was warming up, and the percussion section filled the hallway with its roar. "I'm loving this band," Fiorina said to no one in particular. "Listen to these drums."

The former CEO of Hewlett-Packard, the lone woman in the Republican field, seemed unfazed by the confrontation. After all, Fiorina is accustomed to being called a fabulist—and worse—in this race and well before. During her time in Silicon Valley, she often drew criticism for leaving shareholders feeling shortchanged. Now that she's a candidate for President, her performances in two televised debates so far have been field days for fact checkers. Her statements about Planned Parenthood have drawn widespread criticism for being inaccurate.

Fiorina doesn't much care. Neither, it seems, do the voters. They want a fighter, not an expert witness. Which helps explain why Fiorina has risen from also-ran to credible contender. Her political statements reinforce beliefs her audiences already hold. Among her most ardent supporters, what matters most is her ability to make the case for the GOP and for herself. And when she's confronted with the contrary, she just heads to her next stop. She does not have time to litigate the details.

Even by the unusual standards of the 2016 GOP primary, the Fiorina campaign is in a league of its own. No lofty policy speeches or television ads are planned through the campaign. She's betting instead that she can win this through personality. Judging from three days TIME spent with Fiorina in October, she faces better odds than most. The 61-year-old Fiorina is a masterly saleswoman and a barometer of her audiences' moods. "Iowans don't worry a lot about the pundits or the polls or the money," she says, pointedly downplaying her critics and shortcomings. "What they worry about is if you show up in their living rooms, at their chili cook-offs, at their football games."

PHOTOGRAPHS BY M. SCOTT BRAUER

Carly Fiorina has always been good at working the refs and ignoring bad calls. When she missed the deadline to apply for business school, she refused to take no for an answer and insisted she be allowed to speak to the dean. She talked her way in. She moved her way up through the ranks of AT&T before decamping to Lucent, an AT&T spin-off. There, she was such a star that Hewlett-Packard made a play for her, elevating Fiorina to the rarefied stratosphere of female CEOs. (Even today, women at that rank are hard to find: just 23 *Fortune* 500 CEOs are female.)

Fiorina shares this version of Carly-ology with voters, and she's a talented bard. In her telling, she started as a secretary in a nine-person real estate office and peaked as CEO. But like so much that is part of Fiorina's bid, her only-in-America story has earned a second look. It turns out that she actually took a break from her secretarial work to earn the first of her two graduate degrees in business. It's a genuine up-by-the-bootstraps story, only with footnotes missing. Fiorina shares only what she thinks will help her cause.

She seldom brings up that she was fired from the Hewlett-Packard C-suite in a spectacular clash with the storied firm's board of directors. Members of the Hewlett and Packard families objected to a Fiorina-led $25 billion merger in 2001 with Compaq, then a leading maker of personal computers. She narrowly pushed through the merger, although detractors said she promised more than she delivered. She counters that she steered HP through an early tech crunch that killed peer companies like Gateway.

Debates over her stewardship now color much of her campaign. Yale School of Management's Jeffrey Sonnenfeld has called her time as CEO a disaster: HP lost half of its value while the S&P index dropped just 7%. Even as rivals Apple and Dell rose and Facebook started on Harvard's campus, HP went nowhere.

Fiorina brushes off the criticism. She's running as a leader, not a CEO. Voters are looking for a candidate who promises them help. "For someone who is coming at this as the least-known candidate in the field, still, I appreciate the fact that I have an opportunity to meet people face-to-face and they get to know me," she says.

But dodgy claims are becoming a Fiorina hallmark. She says 1,700 banks were put out of business by a bill that passed in the aftermath of the Wall Street meltdown of 2008. Federal Deposit Insurance Corporation data shows community banks were suffering long before Dodd-Frank went into effect in 2010; one-office banks have seen their numbers fall 84% in the past 30 years. And she likes to tell audiences that 307,000 veterans have died awaiting care through the Department of Veterans Affairs. That figure is based on a VA internal watchdog report, but its authors also caution that the data is murky at best, and at least 258,367 of the deaths happened at least four years ago—well before the current scandal became public. She suggests that Common Core education standards are a product of the Department of Education and that the next President can undo the current deal with Iran over its nuclear program; neither is true.

Again, her out-of-context claims or incomplete information might not matter. Certainly, Fiorina seldom suffers from self-doubt. She has used her gender shrewdly, dismissing it as a rationale for Hillary Clinton's campaign while making clear it is a vital strength of her own. "Hillary Clinton is going to be the Democrat Party's nominee," she often says. "I cannot wait to debate her." First, though, she has to navigate the GOP primary campaign, which is shaping up to be much longer and more complicated than any in memory.

FIORINA'S PROPOSALS

Urging a smaller role for government and dramatically lower spending, Fiorina is telling voters that a government on her watch would be much different than the one Barack Obama oversees now.

SPENDING

Cut every department and agency budget to zero and make every agency justify spending. She says such a change would stop spending from growing as it has over the past half-century.

PLANNED PARENTHOOD

Defund the health care provider and send money to community health centers and pregnancy centers.

IMMIGRATION

No path to citizenship for immigrants in the country illegally, but she is open to a noncitizen status for newcomers.

TECHNOLOGY

Use data and technology to track government programs and identify inefficiencies that need reform. The former tech exec also says she would ask Americans to advise her via smartphone.

FIORINA'S BIGGEST DEFICIT in terms of credibility might be her attacks on Planned Parenthood. In the face of overwhelming evidence that her public statements are not accurate, she refuses to give an inch. It's why Planned Parenthood backers are regulars at her events, often carrying a banner calling her CARLIE FIBORINA.

"Carly Fiorina continues to double down on her lies about Planned Parenthood," Planned Parenthood organizer Kate Kight says after a Fiorina town hall in Waterloo. "She's not running on the truth." Kight and her friends in pink WOMEN ARE WATCHING T-shirts are familiar guests at Fiorina events, where they try to elicit an acknowledgment that Fiorina's description of Planned Parenthood's handling of fetal tissue is not correct.

It's an uphill battle. Fiorina's criticism of Planned Parenthood is standard fare in her speeches. She calls it a political slush fund for proabortion Democrats, a harvester of fetal tissue for profit. She says its leaders have not denied it, so that's a tacit admission. (In fact, Planned Parenthood president Cecile Richards testified to the opposite when she appeared before Congress. And Fox News Sunday host Chris Wallace challenged Fiorina on this: "There is no actual footage of the incident that you just mentioned." Fiorina gives no ground: "I've seen the footage.")

It might not matter. The Republicans who will pick their party's nominee are not, at the moment, rewarding nuance or attention to detail. Wonky former Florida Governor Jeb Bush, who prides himself on substance and has put out a thoughtful tax plan, is struggling to keep his campaign afloat while cutting aides' pay.

Meanwhile, businessman Donald Trump is enjoying success based on his celebrity and willingness to say almost anything to win another round of headlines. Close behind, retired neurosurgeon Ben Carson continues to capture the GOP's imagination with worries about Muslims and government growth. Neither Trump nor Carson has previously sought

Supporters gather to meet Fiorina in Sandown, N.H., on Sept. 5

M. SCOTT BRAUER

elected office as a Republican, and both men appeal to voters' desire for someone who promises to upend Washington.

Still, Establishment-minded Republicans note that Trump spends more time sending provocative tweets and calling cable-news and talk-radio hosts than mounting a traditional campaign in Iowa and New Hampshire. Carson, meanwhile, is on a two-week break from the campaign. Instead of meeting with voters, he is selling his books. It hasn't seemed to hurt him in the polls much.

Then there is Fiorina, who perhaps is best built of the three for the long haul. She remains in the hunt in the early-nominating states, even though her national poll numbers have dipped. After her second debate, she rose to 15% support, according to a CNN/ORC national poll. The same poll saw her slump back to 4% in results released Oct. 19. Of the self-declared outsiders, she's the one who is trying to run a campaign along traditional lines with frequent stops in Iowa, where she has participated in more than 70 political events. A skilled spokeswoman, Fiorina decries Washington as a rigged town and politics as a stacked-against-you system that rewards insiders and the powerful. (She largely ignores that she is a former powerful CEO who has advised Secretaries of Defense, State and Homeland Security, offered counsel to a CIA director and worked as a senior adviser and spokeswoman for John McCain's White House bid. She even tried to make it to Washington before, running in 2010 for the Senate.)

But now here she is, climbing the high school bleachers to watch the pregame show and taking selfies with the cheerleaders. A day earlier, she stopped by a different school so its journalism class could interview her—and then joined their on-camera dance party. She is grabbing soup at Panera, snacking on grapes between events and joking about cold pizza with AM radio hosts.

She tells voters that she has held the top security clearance available as an adviser to warriors, diplomats and spies. But two minutes later she's talking about how untrustworthy government has become and how voters need to help her oust the lot of them. That's a message others are carrying, but one that sounds, well, less angry and more reasonable when Fiorina says it.

At a Pleasant Hill home, a gay-rights activist pressed her on whether LGBT workers deserved protections. "As a CEO, we provided benefits to all same-sex couples," Fiorina said. She then said government should step in—to protect businesses that want to discriminate based on their faiths. When confronted about climate change, she said the bigger threat was coming from Islamic State militants. "Don't roll your eyes, young lady," Fiorina said curtly. "That is a fact." ◻

Women Flip the Script

Sandra Bullock and her A-list sisters are hunting down Hollywood's best new roles—the ones written for men

BY ELIANA DOCKTERMAN

SANDRA BULLOCK'S LATEST CHARACTER, "Calamity" Jane Bodine, is a ruthless political consultant given to rattling off guileful quotes from Sun Tzu and Machiavelli. She's damn good at her job, tends to pull frat-boy pranks when on a bender and couldn't care less if she doesn't have a date lined up. In Hollywood shorthand, she's as ornery as Paul Newman in *Cool Hand Luke* and wilier than George Clooney in *Ocean's Eleven*. And if Jane Bodine sounds two steps beyond tomboy, that's because *she* was a *he* in the original script for Bullock's new film, *Our Brand Is Crisis,* in theaters Oct. 30. Inspired by pugnacious political hit man James Carville, the role called for a swaggering archetype—Clooney was once attached to the part—which is exactly why Bullock wanted it for herself.

For generations, top actresses fed up with playing the adoring wife or eye candy have bemoaned the relative dearth of meaty roles for women—the kind that bring Meryl Streep awards acclaim on an annual basis. Despite Bullock's Best Actress Oscar for *The Blind Side* and a worldwide box-office take of nearly $5 billion, she struggled in recent years to find challenging scripts that didn't ask her to don another spacesuit for a *Gravity* copycat or play another thorny-on-the-outside but goofy-on-the-inside singleton. Where were all the great roles? Apparently, they were sitting in Clooney's slush pile. So she asked her agent to start sending her parts written for men.

"I thought of it a couple years ago before I did *The Heat,* when I was looking for comedies," Bullock says on a recent morning at the Four Seasons in Beverly Hills, sipping tea with *Our Brand Is*

PHOTOGRAPH BY PETER HAPAK FOR TIME

Crisis producer Grant Heslov and director David Gordon Green. "I said, 'I want to do what Jim Carrey's doing.' I was looking for something he didn't want."

Consider that sentence: despite being one of the most bankable actresses in the world, Bullock wanted to scoop up the crumbs from Carrey's banquet table. Imagine the parts women merely nominated for Oscars must be offered.

It's not just an issue of character depth; it's one of sheer volume. Among last year's 100 top-grossing films, 12 featured female protagonists. Of all the speaking characters, only 30% were women, according to research from Martha Lauzen at San Diego State University, who began issuing an annual "Celluloid Ceiling" report in 1998 to lay bare Hollywood's gender gap.

Now 51, an age at which Hollywood generally starts relegating actresses to secondary roles such as high school principal, judge or grandmother, Bullock didn't have much to lose by approaching producers with her flip-the-script scheme. "I figured, What are they going to say? No? I hear no a lot. I'm used to it."

Bullock wasn't the only one asking. On Nov. 20, Julia Roberts will star as a vengeful FBI agent in *Secret in Their Eyes,* based on an Argentine novel and subsequent film in which her character was named Ricardo. After shaving her head to portray a military commander in *Mad Max: Fury Road,* Charlize Theron is currently in talks to play an assassin in *The Gray Man,* a role previously offered to Brad Pitt. In 2010, Angelina Jolie took the title role in *Salt* after Tom Cruise dropped out.

Emily Blunt's role as a federal agent fighting a Mexican drug cartel in *Sicario* is currently building Oscar buzz. But if it had been up to the producers who first considered Taylor Sheridan's screenplay, she never would have gotten a shot. "When Taylor was shopping the script around, he was approached by one financier who said, 'It is a done deal if you just make her a guy. We will up your budget,'" Blunt says. "This is the sort of sad state of affairs when films are trying to get made with a female protagonist at the core. Taylor just kept walking out of the room, and walking out of the room, and thank God he did."

THIS SMALL BUT SIGNIFICANT trickle of gender-blind casting comes at a cultural moment where women in a variety of industries are pushing for change, from salary equity to paid maternity leave to an end to "manterruptions" in meetings. On issues from pay negotiations to presence in boardrooms, Facebook COO Sheryl Sandberg's demand that women "lean in" still reverberates. In politics, Hillary Clinton has simply stated that what America needs now is a woman in the White House.

If Hollywood isn't swept up in this call for parity, then perhaps it will be compelled by the dollars-and-cents argument. An analysis of the top-grossing films of the past two decades showed that movies with two female characters who talk to each other about something other than a man (known as the Bechdel Test) had smaller budgets but earned more money, dollar for dollar, than those that passed under such a relatively low bar. On television, series creators like Shonda Rhimes *(Grey's Anatomy, Scandal)* and Jenji Kohan *(Weeds, Orange Is the New Black)* have proved there's a huge and loyal audience interested in women's stories.

In the end, it may be pure embarrassment that promotes change. Jennifer Lawrence, the top-grossing actor of 2014, recently wrote an essay on the pay gap in Hollywood, confessing that she blamed herself for not being a tougher negotiator when hacked Sony emails revealed that she made less on *American Hustle* than her male co-stars, Bradley Cooper, Christian Bale and Jeremy Renner—or, as she put it, "the lucky people with d-cks." Since then, other actresses have come out protesting their comparatively small paychecks.

Bullock believes the Sony hack was a blessing in disguise. "Thank goodness Hollywood got a spanking," she says. "It's hard because why should I complain? Very few people get to do what we get to do. I know as a woman in the business, the likelihood of me still working at my age was almost impossible, and yet here I am."

"Other women felt exactly the same way," she adds. "And we felt shame because of it. Now something has shifted. All the women started bonding and going, 'Wow, why don't you get this? You did an amazing job. Why aren't you getting part of the merchandising?' We came together, shared this information and supported each other."

Men, too, are pitching in. After Lawrence's essay, Cooper promised that he would share what he's making with female colleagues before they ink their own deals. Judd Apatow, who built his career on raunchy bro-coms, is now partnering with writers and performers like Kristen Wiig *(Bridesmaids),* Lena Dunham *(Girls)* and Amy Schumer *(Trainwreck).* *Mad Max* director George Miller even ferreted a female lead into a dude-heavy

This fall's gender-bending films include Our Brand Is Crisis *(left two frames),* Sicario *(center frames) and* Secret in Their Eyes

FROM LEFT: WARNER BROS (2); LIONSGATE (2); STX ENTERTAINMENT (2)

franchise. Theron's Furiosa frees a group of female sex slaves from their master, leaving behind a message written on the wall: "We are not things." Furiosa then outshoots, outdrives and outtalks Tom Hardy's grunting Max. Feminists went wild for the character—and so did the rest of the world, as *Fury Road* racked up $375 million in ticket sales.

DESPITE THE SUCCESS of films like *Frozen* and *The Hunger Games,* studios seem determined to lumber behind. "Those are called 'the exceptions'" by studios, says Bullock. She suggests that lead roles for women used to be more common, especially in the days when studios signed multideal contracts with their stars and had to create vehicles to support them—think Marilyn Monroe and Jane Russell skewering gold-digger stereotypes in *Gentlemen Prefer Blondes* or Katharine Hepburn sparring with Spencer Tracy in *Adam's Rib.*

But after the action-movie boom of the 1980s and the subsequent rise of superhero blockbusters, opportunities for women in Hollywood have become scarcer. Part of the problem is the gender gap behind the camera. The "Celluloid Ceiling" report found that when a film is written and directed by men, women hold a leading role only 4% of the time. But if just one woman works on the screenplay or behind the camera, that figure increases tenfold. To that end, this spring Streep funded a mentoring program for female screenwriters over the age of 40.

Geena Davis became a star, thanks to rare female-centric stories such as *Thelma & Louise* and *A League of Their Own.* "I was getting all these incredible parts and averaged about a movie a year," she says. "Then in my 40s I made one movie. The interesting and complicated parts suddenly disappeared as soon as I hit that birthday." Since then, she's become a gadfly about women's roles in TV and film—reminding studio heads and networks that they're missing huge opportunities.

Unlike most gadflies, though, Davis has hard data, reams of it, from academics at USC's Annenberg School for Communication and Journalism commissioned for her Geena Davis Institute on Gender in Media. For the past decade, she has presented those findings to studio heads and producers, urging them to make changes.

One of her studies looked at the employment rates of male and female characters in children's films. If a character has a job, 80% of the time it's a man. That might have made sense in the 1950s, but in the real world women make up half the workforce. Some filmmakers are open to Davis' message, but she says top-down change takes time. In the meantime, she thinks the most realistic method for talented actresses who want characters with robust stories is to follow Bullock's lead. "I've been advocating for this strategy for years," says Davis, pointing out that only 11% of writers on top-grossing films are women. "Until more women are given opportunities to write scripts, this has to be the way it is."

That leaves actors like Blunt to try to communicate the realities of being a woman to men writing her roles. "I always say to male writers, 'Write me as a guy, and I'll do the girl stuff. Write me as you would a guy—as complicated, as conflicted, as at fault,'" says Blunt. "Often a male writer writes female roles to protect a feminine ideal in some ways."

For *Our Brand Is Crisis,* based on Rachel Boynton's 2005 documentary of the same name, producers Clooney and Heslov were willing to adapt the story of Carville's cutthroat work on a Bolivian presidential campaign in order to incorporate Bullock. Not a lot of tinkering was necessary. "She was the right piece," says Heslov. "Not that much changed in the rewrite."

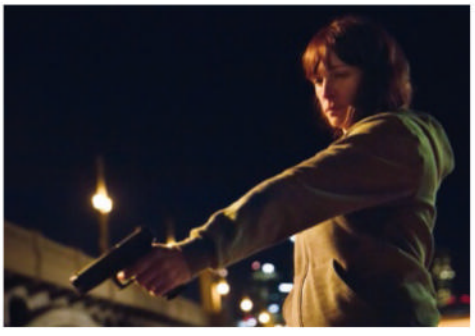
"The clothes, mostly," jokes Bullock.

Director Gordon Green, whose films have varied from blockbuster comedies like *Pineapple Express* to intimate indies like *George Washington,* says he admires Bullock's refusal to be limited by her résumé—or her gender. "You don't find too many people in this industry willing to take risks, to step outside of their box."

Bullock shakes off the compliment. "I've been told I put on blinders and just crash forward," she says, "without considering the repercussions."

As Lawrence joked in her essay, Hollywood stars negotiating for a few extra million dollars, a few more lines and a few fewer nude scenes might elicit eye rolls from most. But their success could determine whether popcorn-nibbling preteen girls will come to think of themselves as the apple of some man's eye or as an FBI agent, an astronaut or a political consultant.

"This is bigger than Hollywood," says Bullock. "It's not just about the money and the roles. It's how we're perceived and talked about. Why are we considered not as worthy just because of our sex?" That's precisely why she asked to turn James into Jane. —*With reporting by* DANIEL D'ADDARIO



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'I DIDN'T PUT ANY THOUGHT INTO IT BECAUSE IT DIDN'T OCCUR TO ME THE MOVIE WOULD GET MADE.' —PAGE 55

BOOKS

Renaissance woman Carrie Brownstein writes of her life in rock

By Nolan Feeney

IF HIPSTERS HAD A PATRON SAINT, it would be Carrie Brownstein. As one-third of the band Sleater-Kinney, which TIME once hailed as America's best rock group, Brownstein rose from the embers of a '90s feminist punk movement to become an indie-rock icon. She hopped from concert venues to red carpets as a co-creator of IFC's Peabody Award–winning comedy series *Portlandia,* in which she and ex–*Saturday Night Live* star Fred Armisen satirize the quirky lifestyles of Oregon's most stereotypical, eco-conscious, flannel-wearing residents. (The first episode, from 2011, featured a now infamous sketch at a farm-to-table restaurant, where their characters ask whether the locally raised, free-range chicken on the menu had any friends.)

Now, with *Hunger Makes Me a Modern Girl,* a memoir out Oct. 27 about her time in the band, Brownstein, 41, adds author to her counter-culture résumé. "I always felt like such an outsider, always existing on the periphery, and I am really grateful for that," she says. "Starting from a place of normalcy or mainstream, you don't get the same gumption or drive that you do from the fringes."

Hunger, which gets its title from the lyrics of a Sleater-Kinney song, is the story of how she patched together not just a life, but a remarkably successful one, from the fringes. It's not meant as a how-to manual,

AUTUMN DE WILDE

but it does show how Brownstein's effortlessly cool image—and the quietly chic style that launched a thousand Pinterest boards—came only after years of insecurity and hustle. "This is a story of the ways I created a territory, something more than just an archipelago of identities," Brownstein writes.

She wouldn't have guessed she'd be here after Sleater-Kinney announced an "indefinite hiatus" in 2006. That year she won the Oregon Humane Society Volunteer of the Year Award, spending her free time spearheading adoption programs and hosing down dog poop. She worked in an ad agency for six months. She blogged for NPR. She balanced *Portlandia*'s comedy with a dramatic role in the acclaimed Amazon series *Transparent,* which returns for a second season in December.

"I really wondered what my value was," Brownstein says of her time away from the band. "Do I have value outside of work?" The answer would appear to be yes—although her value in rock hasn't gone away. This year's ferocious comeback album, *No Cities to Love,* gave Sleater-Kinney its biggest sales week ever in January and introduced it to a new wave of listeners. If being reduced to our occupations is a common existential fear, then Brownstein is revered by fans because she represents the possibility of a fruitful, fulfilling life not defined by any one title—or rather, defined by many.

AS A CHILD in Redmond, Wash., Brownstein remembers, she had a strong desire to perform and become someone else. She'd dress up and put on concerts, but family turmoil—her mother battled an eating disorder, her father was closeted and hard to connect with—later turned these impulses into "a way of escape," she says. After playing in a few bands in her teens and college years, she met Corin Tucker and moved to the fertile music scene of Olympia, Wash., where the two guitarist-vocalists formed a group they named after a street near their practice space. (Drummer Janet Weiss joined in 1996.)

For Brownstein, Sleater-Kinney was a fantasy that didn't require exaggerated stage personas or dress-up to live out. With voices that howled and yelped and guitars that circled one another like birds of prey, their songs tested out the power and privilege Brownstein didn't feel she had. Singing them, she bottled some of it for herself. "I could play at bravery in the songs, I could play at sexiness or humor, long before I could actually be or embody any of those things," she writes.

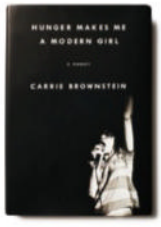
Sleater-Kinney wrote songs that addressed desire, rage, the male gaze and sexual assault, practicing a kind of feminism that couldn't be "sloganized and diminished," Brownstein writes. Still, it had an uneasy relationship with the press and received plenty of sexist coverage, some of which Brownstein rounds up in the book to humorous effect.

Brownstein briefly dated Tucker in the band's early days and was outed after a 1996 *Spin* magazine story referenced the breakup, even though neither brought it up in interviews. Perhaps as a result, Brownstein, who has since identified publicly as bisexual yet expressed an aversion to particular labels, is private about her relationships and barely details them in the book. Today, acknowledging the importance of her visibility as a woman and queer person without letting those identities eclipse her work is a tough line to walk."To deny it does feel like an amputation—what, just say, 'No, don't look at us as women'?" she says. "How can I start to parcel out parts of myself to determine what made this band or how people should view it?"

The book ends with Sleater-Kinney's hiatus, skipping *Portlandia,* and relegating the reunion to an epilogue. Tucker wanted to spend more time with her husband and young son, while Brownstein had health issues (a bout of shingles, as well as anxiety and depression) that made her a volatile presence on tour. (She once fantasized about slamming her hand in a door so she could go home.) "Considering we weren't doing a bunch of cocaine and heroin, it's as dramatic as it gets," Brownstein says.

Hunger doesn't try to enumerate every hat she's ever worn, only what emboldened her to keep experimenting. Through her band, she says, "I built up the confidence I needed to keep moving through the world in all of the different ways that I wanted to." She's found an identity that works for her, even if the job descriptions can't keep up. ◻

GREATEST HITS



Planting the seeds
Brownstein says she first got the idea for a memoir while writing about music and culture for NPR's Monitor Mix blog from 2007 to 2010

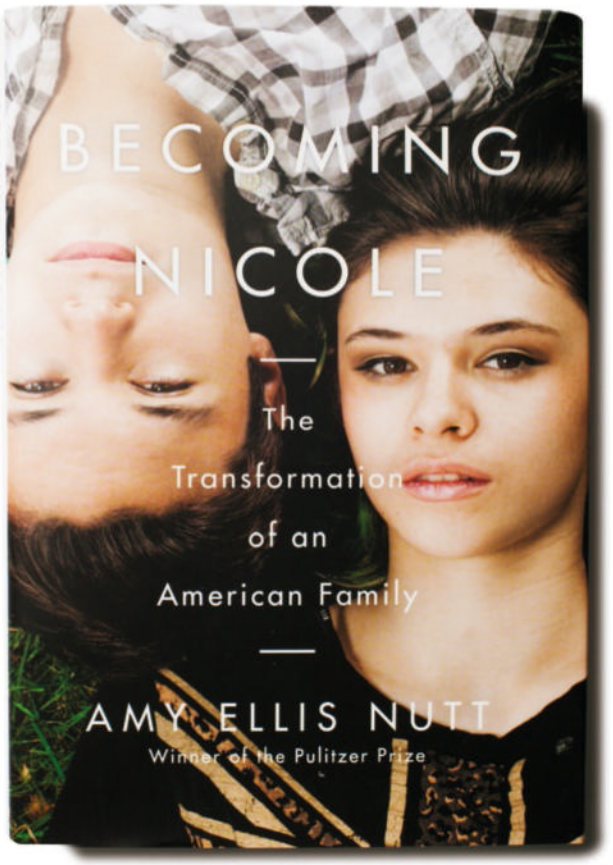
Hipster's paradise
Brownstein and Armisen started making web videos in 2005 before conceiving *Portlandia,* which has already been renewed for two more seasons

Encore performance
Sleater-Kinney announced its comeback by sneaking a vinyl seven-inch of a new song, "Bury Our Friends," into a retrospective box set released last fall

PORTLANDIA: PHOTOFEST; BROWNSTEIN: GETTY IMAGES; SUPERGIRL: WARNER BROS.

NONFICTION

Identical twins in all but one way



WHEN JONAS MAINES TRIED to read a draft of his family's story this past summer, he got through only the first few paragraphs of the prologue before throwing it across the room. "I couldn't touch it again," says the 18-year-old identical twin of Nicole Maines. "It brought back memories of hearing the way my dad was treating Wyatt. It brought back feelings of anger, frustration and confusion. It was just a little too much for me." For nearly the first decade of her life, Nicole lived as a boy and was called Wyatt by her brother, her parents Wayne and Kelly, her friends and her teachers. But Jonas says he always knew he really had an identical, yet divergent, twin sister.

Becoming Nicole, written by Pulitzer winner Amy Ellis Nutt, is a transgender girl's coming-of-age saga, an exploration of the budding science of gender identity, a civil rights time capsule, a tear-jerking legal drama and, perhaps most of all, an education about what can happen when a child doesn't turn out as his or her parents expected—and they're forced to either shut their eyes and hearts or see everything differently.

"It's pretty hard on me, and it's hard to read," says Wayne, who played the villain for a time as he refused to accept how his child felt. "But there's a lot of men out there who don't understand. They're impacting children all over the country. And we need to help them." His comments echo a cautionary through line in the book.

> 'It's scary when people tell you that *who* you are isn't *what* you are.'
>
> NICOLE MAINES, 18

In an era when there are more high-profile story lines than ever about what it means to be transgender, the twins-ness of Nicole's narrative gives the nature-vs.-nature debate a compelling jolt; she has grown up looking at a mirror image who—cruelly, to her—feels at home in his body.

"It's a gnawing feeling," says Nicole, now a college freshman in Maine, of the male body she once lived in. "It's scary when people tell you that *who* you are isn't *what* you are." The book makes it clear that the fear ripples out. "This was a story not just about Nicole, who knew exactly who she was," says Nutt. "All the family members had to find themselves."

—KATY STEINMETZ

TIME PICKS

MOVIES
Kristen Wiig stars with director Sebastián Silva in the Sundance hit ***Nasty Baby*** (Oct. 23), in which a nurse and her gay best friend decide to have a child and meet with surprising results.

MUSIC
Steve Martin and Edie Brickell's second album together, ***So Familiar*** (Oct. 30), pairs his spirited banjo tunes with her winsome songwriting for a contemporary update to Americana.

BOOKS
In new memoir ***My Life on the Road*** (Oct. 27), feminist pioneer Gloria Steinem reflects on how her nomadic childhood and lifelong travels shaped her into a catalyst for change.

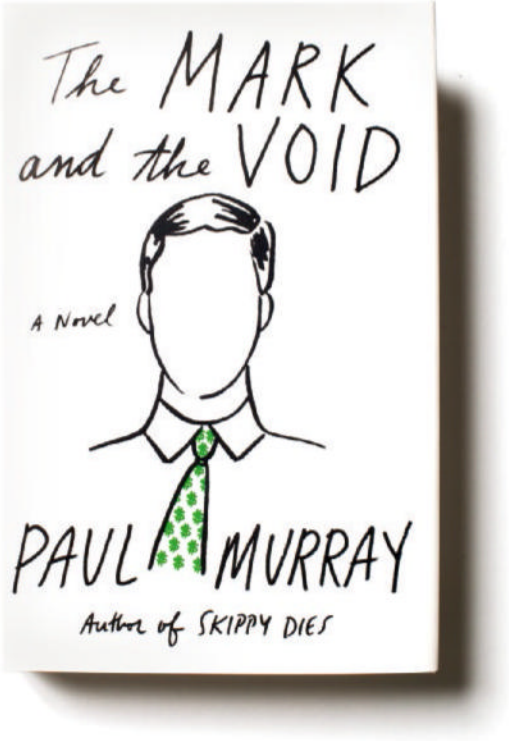
TELEVISION
DC Comics comes to CBS with the premiere of ***Supergirl*** (Oct. 26), featuring Melissa Benoist as Superman's cousin, who must learn to embrace her extraordinary powers.

FICTION

What's so funny about the financial crisis? A lot

IT IS DIFFICULT, THOUGH NOT IMPOSSIBLE, TO WRITE A great novel about a financial crisis. Anthony Trollope's *The Way We Live Now* tells of a Ponzi scheme that ensnares London. Charles Dickens set half of *Little Dorrit* in a debtors' prison. But these writers lived before the credit economy, when the merest hint of speculation could taint your moral fiber. It was easier to make debt into drama when a shilling overdue meant a jail cell, not a late fee. Twenty-first century banking trades in figmentary value—loans backed by loans, homes on high ground that sink underwater. The ship of moral fiber has long since sailed for the Cayman Islands.

That may be why Paul Murray wrote his new novel, *The Mark and the Void,* as a comedy. Murray scored a hit five years ago with *Skippy Dies,* a coming-of-age charmer set in an Irish boarding school. In the Dublin branch of the Bank of Torabundo, he updates that atmosphere of adolescent angst for the postcrash era. There's our narrator, Claude, an amusingly straight-shooting Frenchman; his officious boss Jurgen, who used to play in a reggae band in Munich (Gerhardt and the Mergers, natch); Howie, the pasty-faced boy-wonder trader; and Ish, an Australian free spirit chained by her mortgage to her soul-sucking job.



Into this global band of profiteers comes a writer. This one, coincidentally, is named Paul. His first novel got panned, and now he's looking for a subject that will capture the zeitgeist and enable him to make payments on the "classic Celtic Tiger piece of sh-t" apartment he bought at the height of the boom. He thinks it must be banking. How do the drones of finance spend their days? What motivates them when the world turns against them? And where, if anywhere, do they keep the money?

It wouldn't be sporting to reveal the sharp twists Murray's novel takes as Claude, with Paul as his shadow, attempts to answer these questions, for in them lies the comedy. But by launching his novel with a novelist's quest to document an epic implosion of credit (fiction backed by fiction, as it were), Murray reminds us that in the land of risk and reward, the causal rules of plot don't apply. As Claude and Paul veer into a surreal relationship, their story embraces those timeless themes that mark great novels—the power of family, the triumph of love, the humanizing role of art. It's hard to imagine these ideas being inspired by an investment bank. But the way we live now, perhaps they'd better be. —RADHIKA JONES

> 'It is about time bankers were recognized by the art world. Given that we buy most of the actual art, it is frustrating to be continually misrepresented by it.'

ESSAYS

Humanist in chief

MARILYNNE ROBINSON'S new essay collection, *The Givenness of Things,* was bound to draw attention—as befits the winner of a Pulitzer Prize for her 2004 novel *Gilead.* But in September, Robinson earned an honor unusual in any field—an expansive interview conducted by a sitting President. Their discussion, held in Robinson's adopted state of Iowa, covered faith, morality and humanism—the "Christian thought," as President Obama put it, driving Robinson's new work.

Many of the book's chapters originated as lectures on contemporary culture, but they also serve as guideposts for Robinson's fiction, which is fundamentally about ideas. Here Robinson, a Calvinist, is interested in medieval Europe and the Reformation; her heroes include Shakespeare (a covert theologian) and the Lollards, English dissidents who advocated for a vernacular Bible. She offers a challenge to contemporary American Christians: "I hope … we do and will share a generous and even a costly readiness to show our respect for all minds and spirits."

—SARAH BEGLEY

ROBINSON: AP

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Bonham Carter plays a chemist cum bombmaker in Gavron's gritty political costume drama

REVIEW

Women's vote in *Suffragette* is still uneven, underfunded

ANYONE WHO GREW UP ON DISNEY movies probably makes the same mental association with the women's suffrage movement in Britain: Mrs. Winifred Banks, wife and mother, employer of a certain Mary Poppins and a daffy dilettante chanting "Votes for women!" She may have been a ditz, but she wasn't far from the persistent historical cliché—that the battle for the franchise in the United Kingdom was all about nice white ladies wearing gloves while throwing rocks at windows.

The gloves come off in *Suffragette,* director Sarah Gavron's gritty political drama, which has generated political drama of its own. The film's all-white casting has come under fire as inaccurate and exclusionary; the T-shirts worn during a *Time Out London* photo shoot by cast members Meryl Streep and Carey Mulligan—bearing the legend I'D RATHER BE A REBEL THAN A SLAVE—seemed tone-deaf to Americans, especially those more familiar with the Civil War than the utterances of Emmeline Pankhurst (Streep's character, onscreen for about 90 seconds). Given the message, grit and misery portrayed in the film, criticizing it for such lapses seems churlish. Especially when there are so many other things to criticize.

This very earnest but costumey drama begins in 1912, a year or so after frustrated suffragettes escalated their campaign of arson, destruction and civil disobedience—a period that crescendoed with the death of Emily Davison, who threw herself in front of King George V's horse during the Epsom Derby of 1913. Gavron portrays the suffrage crusade as a working-class movement, one whose members are bludgeoned with societal contempt and police blackjacks. Yet many of those making noble statements possess familiarly posh faces—Helena Bonham Carter, for instance, playing a chemist cum bombmaker whose zealotry gets away from her; or Streep, whose vocal performance as the fugitive Mrs. Pankhurst is another of those unearthly things the actor does routinely and well. (Pankhurst incites the destruction of British property, tells Maud Watts "Never give up the fight" and is spirited away from approaching authorities.) Brendan Gleeson, playing an Irish detective assigned to undermine and brutalize the agitators, is his usual solid self.

> Caught in the cross fire of London police cameras, Maud is implicated as an enemy combatant in what constitutes an early war on terrorism

But it's Mulligan's character Maud Watts, a virtual repository of patriarchal oppression, whose accidental conversion to the cause constitutes the emotional arc of the movie. Watts, a drudge-to-be laundress all her life, is delivering a package on a crowded London street when she's swept up in a provote protest involving prams full of paving stones, shattered glass, screaming women and incriminating photographs. Caught in the sweep of police cameras, Maud is implicated as an enemy combatant in what constitutes an early war on terrorism, waged by a nascent U.K. surveillance state.

Maud comes to exemplify the most dangerous woman as the one with nothing left to lose. Overworked, underpaid, sexually harassed and considered the legal property of her feckless husband Sonny (Ben Whishaw), she's put out of her home for her militancy. And then things get worse. Yes, such things happened. Gavron's touch, though, renders them melodramatic.

Suffragette is also off-putting visually, probably because Gavron's modest budget ($14 million, as reported by *Variety*) compelled her cinematographer, Eduard Grau, to shoot much of the film up close and claustrophobically. Riot scenes become an expressionist collage of bodies and motion; there's little center of gravity, or center of the universe, when the mayhem really gets under way. This might have eliminated the need for elaborate sets or the taking over of city streets, but it also precludes much sense of space, or of London circa 1912. That was the same year the *Titanic* went down, of course, but not male supremacy. Not until 1928—the year Mrs. Pankhurst died, as it happens—did women get the full vote in Britain.

—JOHN ANDERSON

FOCUS FEATURES

REVIEW

Shareef don't like it: *Rock the Kasbah*

OLD-SCHOOL BILL MURRAY, DEADPAN AND gonzo, spices up the amiable mess that is *Rock the Kasbah*. That's both a saving grace and a curse. Because while Murray and his laid-back riffs anchor this oil spill of a story, he needs a more tangible movie to latch onto, and all he gets is a mirage.

Murray plays Richie Lanz, a burned-out music manager way past his '70s prime, working out of a ratty motel in Van Nuys. While watching his assistant Ronnie (Zooey Deschanel) belt out tunes in a bar, Richie meets a guy booking USO tours. But when he and Ronnie arrive in Afghanistan, she's freaked by the bombs and body armor, and flees, leaving cash-strapped Richie with no lifelines but a sympathetic mercenary (Bruce Willis) and a golden-hearted expat hooker (Kate Hudson).

Tagging along on a gun-running adventure, Richie hears Salima (Leem Lubany), a tribal chief's daughter, secretly singing Cat Stevens songs, and his talent-agent antennae vibrate. He scores Salima a slot on *Afghan Star*—that country's *American Idol*—despite the dangers it presents, including branding her an infidel.

Lubany, lovely and fierce, is given little to do despite the fact that her character—an echo of Setara Hussainzada, who received death threats after her headscarf slipped as she sang on the real-life *Afghan Star*—is the film's conscience. Director Barry Levinson's still-biting 1997 satire *Wag the Dog* mixed a similar stew of pop and politics, but *Kasbah,* despite Murray's comic savvy, is mortally scattershot. Its music-industry gags sit awkwardly next to war-zone jokes and cultural quips, landing all involved on a peace train to nowhere.

—JOE NEUMAIER

ROCK THE KASBAH: OPEN ROAD FILMS; SILVERMAN: JASON LAVERIS—GETTY IMAGES

As a washed-up rock manager seeking redemption, Murray hypes an Afghan singer

QUICK TALK

Sarah Silverman

In her new film I Smile Back, *the comedian and actor, 44, plays Laney, a housewife who covers her depression with alcohol and drug use. It's the latest evolution for Silverman, who got her start on* Saturday Night Live. —DANIEL D'ADDARIO

How does your method differ from more experienced dramatic actors? Comedy and drama are different, but they definitely share a wall. But it wasn't a part that should have anything familiar in terms of me or the comedy I do. I wanted to play her very objectively.

Did you purposefully choose a script as far from comedy as possible? I didn't put any thought into it because it didn't occur to me the movie would get made. Most movies don't get made. When it became a reality, I found myself in a ball on the floor trembling, thinking "I can't do this." Then I realized that's Laney's constant state of mind—living in that what-if. That's when I realized, "Maybe I can do this. Because I'm doing it now on my bath mat."

Was it oppressive to live in this dark world each day during production? I was like a 2-year-old who didn't know what to do with her feelings in between scenes. And I'm so glad I didn't know that going in. I would probably have tried to get out of it, because I'm a quality-of-life junkie.

Why is there so much depression in the comedy community? To become funny usually comes from a way of surviving. The reason people become funny is to overcome pain. The most basic is the fat kid making the fat joke first.

You've been in therapy. Did you worry it would make you less funny? There are comedians who have that fear. For me, therapy has opened up a whole new world comedically. The fear that comics have of going to therapy is silly, because it's really just a fear of changing their act at all.

ON MY RADAR

***BREAKING BAD*, SEASON 3**

'I'm only just watching it, tastemaker that I am. I watch it when I'm on my elliptical machine. It's great, because the anxiety feeds me.'

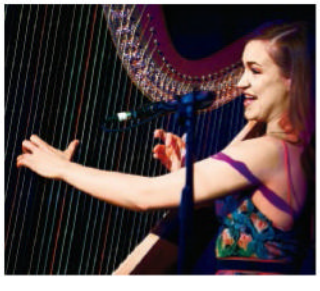
MUSIC

Joanna Newsom's deep dive

JOANNA NEWSOM'S NEW album, *Divers,* out Oct. 23, opens and closes with the sound of hooting owls. It's in keeping with the harpist and singer-songwriter's weirdly beautiful style, which makes use of her warbling soprano, an obscure vocabulary and influences from places as far-flung as Bulgaria and West Africa. For the last decade, she's been cast as alt music's quirky woodland nymph—though that characterization has a way of cheapening just how profound she can be.

The compositions on *Divers* are less sprawling than on her previous albums—but even where they favor the spartan over the orchestral, they trade in weightier material. In the jaunty "Sapokanikan," she recalls the death of the Lenape tribe that once inhabited New York; in "A Pin-Light Bent," she wrestles with her own mortality. Here she's diving for existential pearls: "How do you choose your name? How do you choose your life?" she pleads on the title track. She may not have answers, but it's a sheer pleasure to hear her pose the questions.

—ELIZA BERMAN



Newsom gets introspective

MUSIC

Carrie Underwood returns to her roots on *Storyteller*

A DECADE HAS PASSED SINCE CARRIE UNDERWOOD WON *American Idol* with her brassy voice and Oklahoma-bred charm. Over that time, she's become part of the Nashville firmament, spawning hits on both country and pop radio. With *Storyteller,* her fifth album (out Oct. 23), Underwood doubles down on country-music tradition, spinning yarns of richly realized characters awash in hard love and hard luck.

It's a gutsy move, but it pays off: cohesive and catchy, *Storyteller* finds Underwood telling tales about big personalities. The album opener, "Renegade Runaway," is about a comely heartbreaker who's "tough as nails under that corset," but sonically it brings to mind the slick, exacting rock of mid-'80s Fleetwood Mac. Elsewhere too Underwood engages both Nashville twang and amped-up bombast, a move that is particularly effective on the delicate goodbye kiss "Like I'll Never Love You Again"; "Chaser," meanwhile, splits the difference between shimmering, wounded verses and a defiant chorus that sounds airlifted from an arena-rock show circa 1985.

As is country convention, the stories on *Storyteller* frequently detail the aftereffects of red wine and cheatin' hearts. "Choctaw County Affair" is part honky-tonk confessional, part defiant boast, with Underwood amping up the vengeful vibes that made "Before He Cheats" a taillight smash. More sympathetic figures cross Underwood's path too; there are familiar figures to be found in the overworked and underappreciated regular folk of "Smoke Break," a "She Works Hard for the Money" for the post-Occupy era that celebrates the day's little windows for reflection. But she's most tender on the closing ballad, "What I Never Knew I Always Wanted," a meditation on motherhood that puts the focus back on her own story—the one she's best of all at telling.

—MAURA JOHNSTON

AN *IDOL'S* ASCENT

Since winning *American Idol* in 2005, Underwood has sold more than 65 million records, won seven Grammys and become *Idol*'s biggest earner ever

GETTY IMAGES (2)

Larry David delivered a pitch-perfect **Bernie Sanders impression** during *Saturday Night Live*'s Oct. 17 opening sketch. Sanders later quipped:

'I think we'll use Larry at our next rally. He does better than I do.'

Australian fast-food franchise Chicken Treat had a **live chicken run its Twitter account** by pecking at or walking over a keyboard.

Oxygenics is making ***Star Wars*–themed showerheads** featuring R2-D2 and Darth Vader.

Facebook added a feature that **allows users to block their exes**—or anyone else—from appearing in their "on this day" memory streams.

General Mills made 10 boxes of **marshmallow-only Lucky Charms** that fans could win via social-media competition.

LOVE IT / LEAVE IT

***TIME*'S WEEKLY TAKE ON WHAT POPPED IN CULTURE**

A man accused of leading police on a high-speed chase in Manatee County, Florida, reportedly told officers that **his dog was the one driving the car.**

Lindsay Lohan hinted that she might **run for President** in 2020 (even though she won't be old enough).

New research published in mBio suggests that caramel apples are more apt to **breed listeria** than plain apples, thanks to the sticks they're impaled on.

Rapper Drake said he was "kicked off" *Degrassi*—the popular teen soap that first made him famous—because **the show made him choose between acting and music.**

As of Oct. 21, 2015, the date Marty McFly traveled to in *Back to the Future Part II,* many of the 1989 movie's technological advancements were either real or in development. (Among them: hoverboards, self-tying sneakers and even Pepsi Perfect.) **But we still don't have flying cars.**

After saying he wasn't going "to be sexist," rapper T.I. made a series of **sexist comments about Hillary Clinton.**

DAVID: NBC/UNIVERSAL; CHICKEN TREAT (2); HEART EMOJI: APPLE; LUCKY CHARMS: GENERAL MILLS; CANDY APPLE: ALAMY; BACK TO THE FUTURE: EVERETT (3); STAR WARS SHOWERHEAD: BED BATH AND BEYOND; DRAKE, LOHAN, T.I., CLINTON: GETTY IMAGES

By Daniel D'Addario, Nolan Feeney, Samantha Grossman and Ashley Ross

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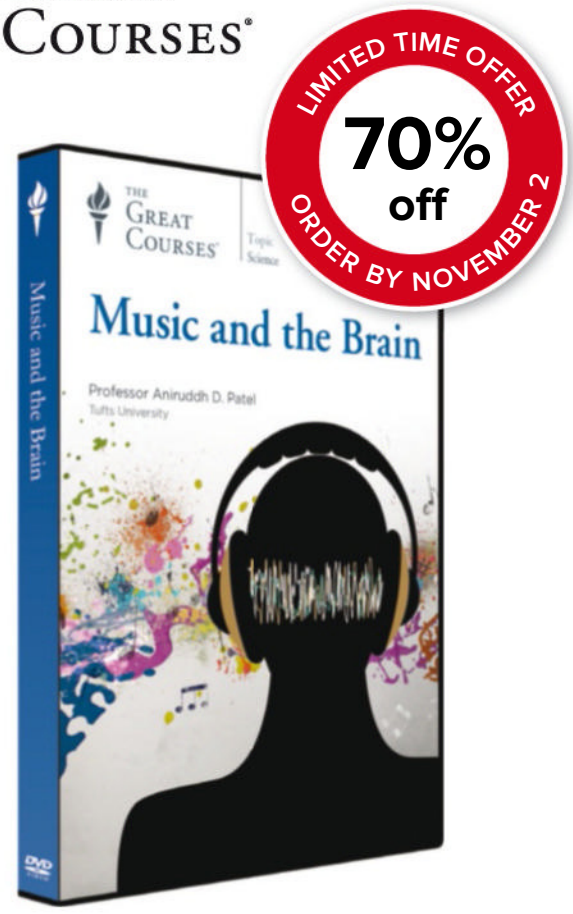

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ESSAY

The daughter dress code: you only get to make the rules for a little while

By Susanna Schrobsdorff

WHEN MY YOUNGEST DAUGHTER WAS ABOUT 6, SHE PULLED on her little black peacoat and her shiny black patent-leather shoes and headed for the door. I asked her to wait up and handed her an umbrella. She looked down at it and then at me as if I'd given her a bag of rocks. "It's like you don't know me at all," she said, shaking her head. At first I laughed, at the way she said it. But ah, yes, the umbrella was light blue and white. She was wearing black and red. Never mind that it really was raining—I'd almost wrecked her whole ensemble.

It certainly wasn't the first time this kid had found my judgment lacking. There was the time I didn't think it was a good idea for her to wear a long magenta scarf on the slide. But the umbrella incident was when I knew my time as wardrobe chief was over. I knew there comes a time in every daughter's life when whatever her mother chooses is absolutely, horribly awful. Eventually they all turn, and it is a sad day. Because the dirty secret of being the mother of little girls is that we kind of like dressing them up.

I WILL CONFESS to making my daughters wear matching Easter outfits and taking pictures of them on the beach every year until dresses became uncool in my home. (Another sad day.) I said it was only to make their grandmother happy, but I was lying. And I'm pretty sure the memory of how glorious those girls looked in their tiny toddler jackets and adorable hats was the only thing that kept me from losing it during their tween years.

Let's face it, the temptation to make our daughters into our idea of who we think they should be is powerful. And they look good in everything! And everyone exclaims over what little girls wear, so there's a whole reward system. You can put them in minuscule jeans with a plaid shirt and a bow in their hair. Or how about pink faux Doc Martens and a calico dress? But here's the other little dark truth of this matter: dressing them up and basking in the compliments you get walking around is also a lesson for young girls that they are judged first on what they wear and how they look in it.

Thanks to school dress codes, my younger daughter is starting to understand that, and she doesn't like it. Neither do her peers. In fact, there's a bit of a rebellion going on across the country. Teen and tween girls have had it with being singled out for wearing tank tops or short skirts and then being marched off to the office because they're "distracting" the boys.

This generation is not going quietly into those smelly gym-shirt cover-ups. There's a high school girl in Orange County, California, who has a 4.0 grade point average and is challenging administrators who said her shirt was too low-cut. Her petition accusing them of violating her First Amendment rights has almost 9,000 signatures. Another girl, in Virginia, said it was sexist to label what she was wearing unprofessional and then force her to wear "dress code" sweatshirt and pants. What's professional about sweatshirts? she asked. (Good point, unless you're Mark Zuckerberg.)

The idea that a tank top is too revealing seems ludicrous to many millennials and teens in an era when women are taking to the streets to "free the nipple" (go topless) or, at the very least, protest catcalling and slut shaming.

SO THOSE WHO'VE EVER TRIED to tell a fierce 21st century teenager what to wear should know that the arc of history is bending against them. But if those cranky teachers win, I want to know how. I'm all for the Constitution and a woman's right to choose what she wears, but I'm having some trouble applying my principles to my actual daughters.

Because there is no pang of angst like the one you get when you see your 14-year-old wearing something that violates all the dress codes you have in your head for her. And there's no argument like the one you'll have if you try to tell her to go and change.

"Why?" she'll say. "Because that's … inappropriate." "Why?" she'll ask again. How do you possibly tell her, It's because you, my little girl, you look too sexy, too grownup—without shaming her or making her feel vulnerable. So maybe you make up something like, It'll be cold in the air-conditioning, so take this cardigan. And maybe she'll look at it like it's an ugly umbrella. If you're lucky, she'll stuff it into her bag just to humor you. Either way, you have let her walk out the door and navigate that line on her own while you wait and worry. Consider it payback for all those hats you put on her before she had a say in the matter. □

ILLUSTRATION BY JULIETTE BORDA FOR TIME

Ted Koppel The former *Nightline* anchor warns against a massive cyberattack and discusses the end of neutral news as his book *Lights Out* hits shelves

Your new book is rather apocalyptic. You talk about electric grids going down and millions of people evacuating cities. Is it time to panic over a potential cyberattack? No, it's time to prepare. The time to panic is if we wait until it happens.

How likely is that? I've talked to experts in the Department of Homeland Security and FEMA. And while there are those who believe it will not happen, the preponderance of those that I spoke to believe not only that it can but that it will. Former Secretary of Homeland Security Janet Napolitano told me she thinks the chances are 80% to 90%.

Director of National Intelligence James Clapper testified in February about cyberthreats and said the likelihood of a catastrophic attack was remote. What Clapper is referring to is the fact that those who have the highest capability—the Chinese, the Russians, for geopolitical reasons—are going to be the least likely to launch an attack. But the danger is as you go down the scale of capability—Iran, North Korea, Syria—the likelihood actually increases.

What are the things that should be done now? Government agencies need to establish some kind of a plan for the aftermath. As of now, FEMA doesn't have it, the Department of Homeland Security doesn't have it, and I see no indication that they're in the process of developing such a plan.

You reported on Mormons, who have institutionalized disaster preparation, as well as other "prepper" communities. What was the most surprising thing you learned? I had a tendency to wrap preppers up with survivalists and to think of survivalists as being people who have bomb shelters stocked with machine guns and all kinds of nonsense. But many of the preppers are really very serious people who aren't waiting for the government to make the plans for them.

Do you have a generator at your house? Have you stocked food? I have a generator, but we've had one for years. I live in a part of Maryland where the power goes out a lot. I did order some freeze-dried food. And I ordered it for my grown kids and grandkids.

What should every person be prepared for? Having a storehouse of food in your home that will last the family three months is a very, very sensible precaution.

At the heart of the book is the question of whether we have become so fractured in how we digest information that Congress and other institutions aren't working. Well, it's become more difficult because at one end of the spectrum you have MSNBC and at the other end you've got Fox, and on all your radio stations you've got a variety of highly politicized talk-show hosts who make any kind of movement in the direction of moderation seem like a betrayal.

> 'Janet Napolitano told me she thinks the chances are 80% to 90%.'

Could a show like the old *Nightline* exist today? Apparently not.

In the era when you were on the air, every weeknight, could you imagine an anchor fabricating stories as Brian Williams did and being allowed back on the air? Look, Brian is an old friend, and I understand what happened to him. There is a difference unfortunately between the kinds of tales that you can tell while sitting at a bar, entertaining your friends, and what you can say when you're on the air. Brian slipped and took the routine and did it on the air, and he has more than paid the price. —MICHAEL SCHERER

ART STREIBER—NBC/GETTY IMAGES

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